C4725-1

Pacific Packers Report

FALL 1981 VOLUME 79, NUMBER 2

MIDWEST RETAIL: At Byerly's, Seafood Pays
SHELF LIFE: Extra Days for Quality Seafood

BEST AVAILABLE COPY

RAYTHEON INTRODUCES

16-COLOR ZOOM

Fish finding at its best with more color ...more selective ranging...more power.

JFV-117: 200-kHz sounding shows bottom at 21 fm with large school rising from bottom (yellow with red center) and small school off bottom (yellow).

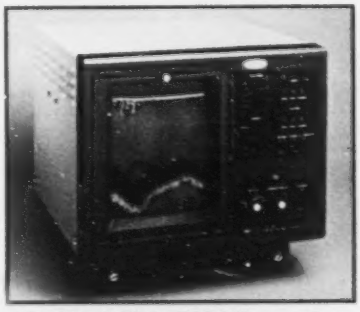
Study a complete sounding...then "zoom in" for a super-close look at depth segments as small as one foot. Do it with stronger echos displayed in greater detail by 16-level color.

Exclusive 16-level color.
With the JFV-117 and JFV-516 Color Echosounders you get both 16-level and conventional 8-level color. The 16-color presentation gives you more bottom characteristics, plankton, data on size and fish species, size of catch, shrimp rising from bottom...all are more clearly defined.

Ultimate Zoom ranging.
Today, only Raytheon offers you zoom ranging. With the JFV-516, you select any of 99 recording-start depths in 10-foot increments and 99 ranges in 10-foot increments from 10 to 990 feet. In all 9,900 different zoom ranges down to 1980 feet...plus bottom-lock. Amazing? Consider the JFV-117. It gives you over ten times that many zoom ranges for super close-up views of segments as small as one foot...plus bottom-lock with split-screen presentation.

Soundings up to 10 kW.
Continuously adjustable 2.2-kW transmitters with exclusive, optional boosters for 5 and 10-kW outputs produce stronger echos processed with less noise for sharper more detailed soundings.

Both monitor and sounder.
The JFV-117 and JFV-516 can be used either as complete single or dual-frequency sounders...as monitors for Raytheon or other fishfinders...or as a combined monitor and self-contained sounder.



JFV-516: A 30-fm 200-kHz sounding clearly shows bottom fish (circle). Clouds of green with yellow specks are plankton and bait fish.

Other features include:
- Bottom-lock expansion.
- Adjustable sweep speeds/"freeze".
- Range/time, depth markers.
- 200, 75, 50, 28 or 15-kHz.
- Low-noise transducers.
- STC Control.
- High/low sensitivity adjustment.
- Interference eliminator.

See us at FISH EXPO booths #325, 327, 329, 426, 428, 430.

- LED bottom depth indicator.
- Feet, fathoms, or meters.
- Proven modular design. Fast servicing with readily available "plug-in's".
- Unmatched two-year warranty.

For full details, see your local Raytheon dealer or contact us directly.

RAYTHEON
MARINE COMPANY
676 Island Pond Road,
Manchester, N.H. 03103
(603) 668-1600

RAYTHEON

Mail To:
Raytheon Marine Company
676 Island Pond Road,
Manchester, N.H. 03103

Send for Free 16-color Fishfinder Brochures.

Yes, I want to learn more about how Raytheon's extra-powerful, 16-color zoom fishfinders can help me find more fish.

Name _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

Vessel size _____

Type of fishing _____

Home port _____

Circle number 63 on the Reader Inquiry Card

Teamwork
Our philosophy at Swiftsure has always been, and will continue to be, one of respect and appreciation for all who are involved in the production and distribution of our products.
It takes dedicated individuals to get the job accomplished. We feel fortunate to have our team of fishermen, plant workers, material suppliers, sea and land transportation people, wholesale distributors, retailers, and restaurateurs working together; and we take none for granted.
We are hopeful our message of respect and appreciation comes through in our daily dealings with you, but to be assured that you know, this space is reserved to convey our thanks.
At Swiftsure, you are part of a team.
Swiftsure
200 West Thomas Street
Seattle, Washington 98119
(206) 284-9860 Telex: 32-1013
Cable: Swiftsure, Seattle WA
Three Daughters

Circle number 77 on the Reader Inquiry Card

FISH WITH A HAPPY FACE.

Alaska Airlines really gives commercial fishermen something to smile about. Like our 7 am weekday non-stop from Seattle to Anchorage, followed by 4 more convenient departures. Plus easy connections to Alaska's prime fishing grounds. And our commitment to on-time performance.

In fact, many of our flights have Passenger Service Coordinators to help make your plane-to-plane connections fast and easy.

So the next time you want to fish with a happy face, fly with a happy face. Ask your travel agent for details.

Alaska Airlines

Fly with a happy face.

Circle number 2 on the Reader inquiry Card

"See Us At FISH EXPO booth #539"

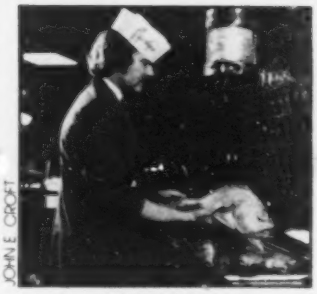
Pacific Packers Report

FALL 1981 VOLUME 79, NUMBER 2

Coming: Seafood Business Report ____ 5
Market Expectations ____ 6
Seafood Business ____ 18
People/Performance ____ 26
Solutions ____ 68
Directory of Processors and Brokers ____ 78

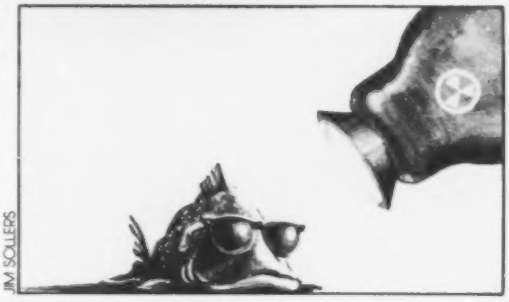
FEATURES

Midwest Retail: At Byerly's, Seafood Pays ____ 28
Shelf Life: Extra Days for Quality Seafood ____ 34
- Spoilage Patterns ____ 36
- Temperature Control ____ 39
- Prepackaging ____ 43
- Irradiation ____ 49
- Carbon Dioxide Atmospheres ____ 53
- Ozone ____ 58
- Additives ____ 61
- Blanching and Refrigerated Seawater ____ 63



JOHN E. CROFT

West Coast fish is popular in the Midwest. Dave Conner of Byerly's prepares fresh red snapper flown in from California. *See page 28.*



JIM SOLLERS

Bombarding fish with radiation is only one of many methods scientists and processors are looking into as they strive to extend seafood's fleeting shelf life. *See page 34.*

URSIN SEAFOODS, INC.

YEARS OF QUALITY AND DEPENDABILITY

• KING CRAB • SNOW CRAB • SALMON • HERRING •

OFFICE:
URSIN SEAFOODS, INC.
150 NICKERSON ST.
SUITE 203
SEATTLE, WA 98109
TELEX: 32-9500
TELEPHONE: (206) 283-2722

A COMPANY FOR THE 1980's

PLANT:
URSIN SEAFOODS, INC.
P.O. BOX 492
KODIAK, ALASKA 99615
S.S.B. KBM 82

TELEPHONE: (907) 486-5724

Circle number 81 on the Reader Inquiry Card

The Chiller/Freezer Designed Exclusively for Fishermen.

That's the New N/CCF MARINE PLATE CHILLER/FREEZER by TURBO MARINE CORPORATION, a division of TURBO REFRIGERATING CO., Denton, Texas.

It offers you fishermen the opportunity of chilling or freezing all your catch of fish or shrimp right in your own boats.

Combined with the expertise and years of practical knowledge provided by TMC with their Condensing Unit, is a quarter century of engineering experience in stainless steel plate making backed by TURBO REFRIGERATING COMPANY.

All TMC's N/CCF CHILLER/FREEZERS feature these reputable stainless steel plates and condensing units.

You can get any of these units with split systems containing either direct engine, hydraulic or electric drive . . . whichever system works best for you.

Our engineers are anxious to help you bring in fresher loads. Just call or write us for more information and a free brochure.

TMC

GENERAL OFFICE
P.O. Box 396
Denton, Texas 76201
817/387-4301

Circle number 80 on the Reader Inquiry Card

Pacific Packers Report

Fall 1981
Volume 79, Number 2
Published by
National Fisherman
Camden, Maine

EDITORIAL AND ADVERTISING OFFICES
4215 21st Avenue West
Seattle, Washington 98199
Telephone: (206) 283-1150

PUBLISHER AND ADVERTISING MANAGER
Bruce J. Cole

EDITOR
Nancy H. Hasselback

PRODUCTION AND CIRCULATION MANAGER
James M. Barker

ART DIRECTOR
Susan Hong

ADVERTISING PRODUCTION MANAGER
Jeanne D. Parker

ADVERTISING COORDINATOR
Robin Lee Guinivan

ASSOCIATE EDITORS
Alfred D. Chandler
William C. Miller

EDITORIAL ASSISTANTS
Janice Kennedy
Ann Gire
Lila Parsons

TYPESETTING
Emily B. Diekmann

PACIFIC PACKERS REPORT will be mailed at no charge to readers involved in the seafood industry. To subscribe, address your request to: PACIFIC PACKERS REPORT, 4215 21st Avenue West, Seattle, WA 98199. In your request, please indicate the nature of your involvement in the seafood industry.

Copyright© 1981
Journal Publications

COVER: Dave Conner, Byerly's seafood coordinator for its St. Louis Park supermarket fills 30 feet of counter space with fresh West Coast Dungeness crab and fillets of bottomfish flown in from both coasts. Photo by JOHN E. CROFT.

Coming: Seafood Business Report

If you are in the seafood business and wish to understand the complexities of moving product from net to table — in a way that will help your profits — you won't find any one national magazine to help you.

Not one, despite the fact there are more than a dozen major business and trade magazines published for the fishing industry.

We are pleased to announce that the need for a national seafood business magazine will be met in 1982. Beginning next spring, we will begin publication of Seafood Business Report, the first national vertical business magazine for the American seafood industry.

Seafood Business Report will be published twice in 1982. In 1983 and thereafter it will be published quarterly for a readership of seafood distributors, buyers, processors, fishing companies, fishermen and others directly associated with the business of moving fish from sea to consumer.

Those who have long relied upon the data and marketing information of Pacific Packers Report need not worry. Pacific Packers Report will be an essential part of Seafood Business Report. As a special spring issue of Seafood Business Report, the Pacific Packers Report will contain all the valuable company production data, landings, and other market data which have made it so useful.

The editorial possibilities of Seafood Business Report are exciting. For the first time, a seafood buyer in food service or retail will be able to pick up a single magazine and find predictions of how resource availability, catches and government management will affect the prices he pays. Fishermen and processors will learn in Seafood Business Report how seafood consumption trends and marketing are affecting their business.

Seafood Business Report will treat the seafood industry as a complex, vertically structured industry in which harvesting, processing, marketing, and distribution levels are profoundly influencing each other.

Seafood Business Report will offer solutions to industry marketing and quality control problems in the food service, retail and processing sectors. The Byerly's Supermarket story in this issue of Pacific Packers Report is an excellent example of a successful marketing approach at the retail level, an approach that could be used as a model nationwide. Watch for more stories like it on both food service and retail operations.

The series in this issue covering shelf life and the article on full utilization in our last issue are indicative of how we will provide readers with the information they need regarding important advances in technology affecting their business.

Watch also for Seafood Business Report to overuse the term "high quality." We are going to push for high quality in seafood. And push. And push. And push.

What the reader will find in this issue of Pacific Packers Report is only a taste of what Seafood Business Report will offer. We think you will like what you find in this issue and in Seafood Business Report next year.

Bruce J. Cole
Publisher

MARKET EXPECTATIONS

Recession? Not According to Consumers

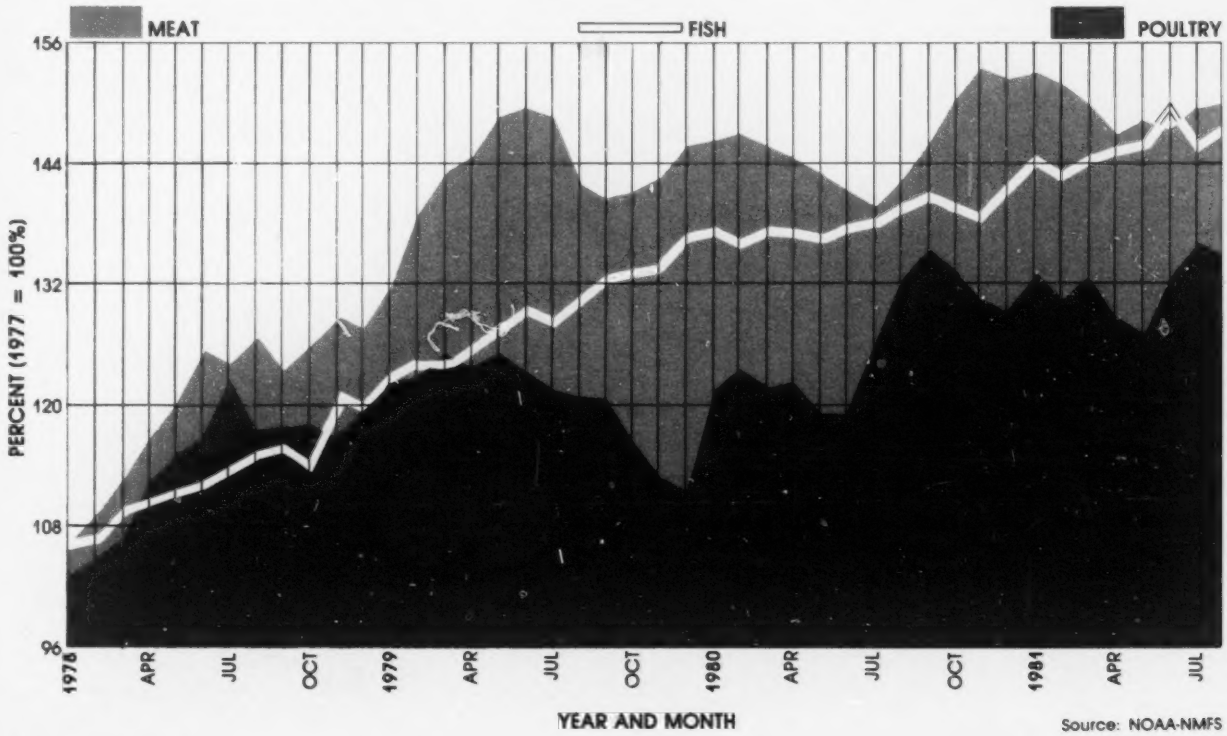
In a year described as puzzling and strange, economic forecasters have not been able to plug in formulas to pinpoint the nation's future. But all agree the forecast hinges on the outlook for interest rates.

After enjoying healthy sales and higher prices through 1980, the seafood industry is now in a slump and, except for certain high priced shellfish products, sales will remain sluggish until the U.S. economy strengthens.

The slump is shared by red meat and poultry processors. Economic indicators point to an official recession, but seafood sales may not suffer further because gains in personal income, higher rates of employment and lower inflation have bolstered consumer spending, sustaining demand. Personal income rose a healthy 1.6 percent in July, following a 0.7 percent increase in June. Unemployment declined to a seven percent rate in July, its lowest level since April 1980.

Consumers are defying the gloom as they increase spending, perhaps encouraged by Reagan's tax and budget cuts. Restaurant spending is up an adjusted 1.6 percent through July for the year from last year's level for the same period, while grocery-store sales of food decreased 0.6 percent.

Continued high interest rates will stifle exports as the dollar increases in value against foreign currencies. Canned and frozen inventories will be held at a minimum to avoid the high cost of financing supplies.



Source: NOAA-NMFS

The National Restaurant Association predicts the food service sector will claim 50 percent of the nation's food bill by 1990 if long-term demographic trends continue, such as the increases in the number of two-income households, smaller families, and an older population. Currently, food service's share is 40 percent of food sales, up 53 percent from 1970. That's good news for seafood, which tops the list of entrees ordered in dinner-house restaurants, comprising 35.1 percent of total entrees ordered. The growth of seafood orders over the past three years has been double the growth of beef orders. Therefore, increased restaurant traffic — a result of healthier real disposable income — translates to increases in seafood demand and consumption.

Seafood will not receive as strong a boost from escalating beef prices as had been expected. Predictions made in the beginning of 1981 for an 18 to 20 percent hike in the price of beef have been tempered to a nine percent increase for the year. More cattle are on feedlots than had been expected and consumer demand is weak due to resistance to 1980 price increases.

Pork prices are expected to increase substantially by the end of the year because farmers cut back production after suffering from a soft market in 1980.

Poultry producers, aided by chicken's short gestation period, will increase production to claim a greater market share. Both poultry and pig farmers will be bolstered by a record wheat crop, the second-largest corn crop ever, and a bumper soybean crop, if U.S. Department of Agriculture predictions prove to be correct. Consumers may see lower poultry prices by the end of the year.

Fortunately, consumers seek variety in their diet, thus seafood will be substituted for chicken as red-meat sales decline. Retail prices for seafood will become firm with winter's squeeze in supplies and the consumer movement away from beef and pork.

Despite the overall sluggishness, changes are taking place within the seafood industry. Domestic landings of cod, flounder, rockfish and haddock have increased by 240 million lbs. in the past five years. Because domestic processors are not set up to freeze on a large scale, it can be assumed that most of this 47 percent increase has been absorbed in the fresh form by American consumers.

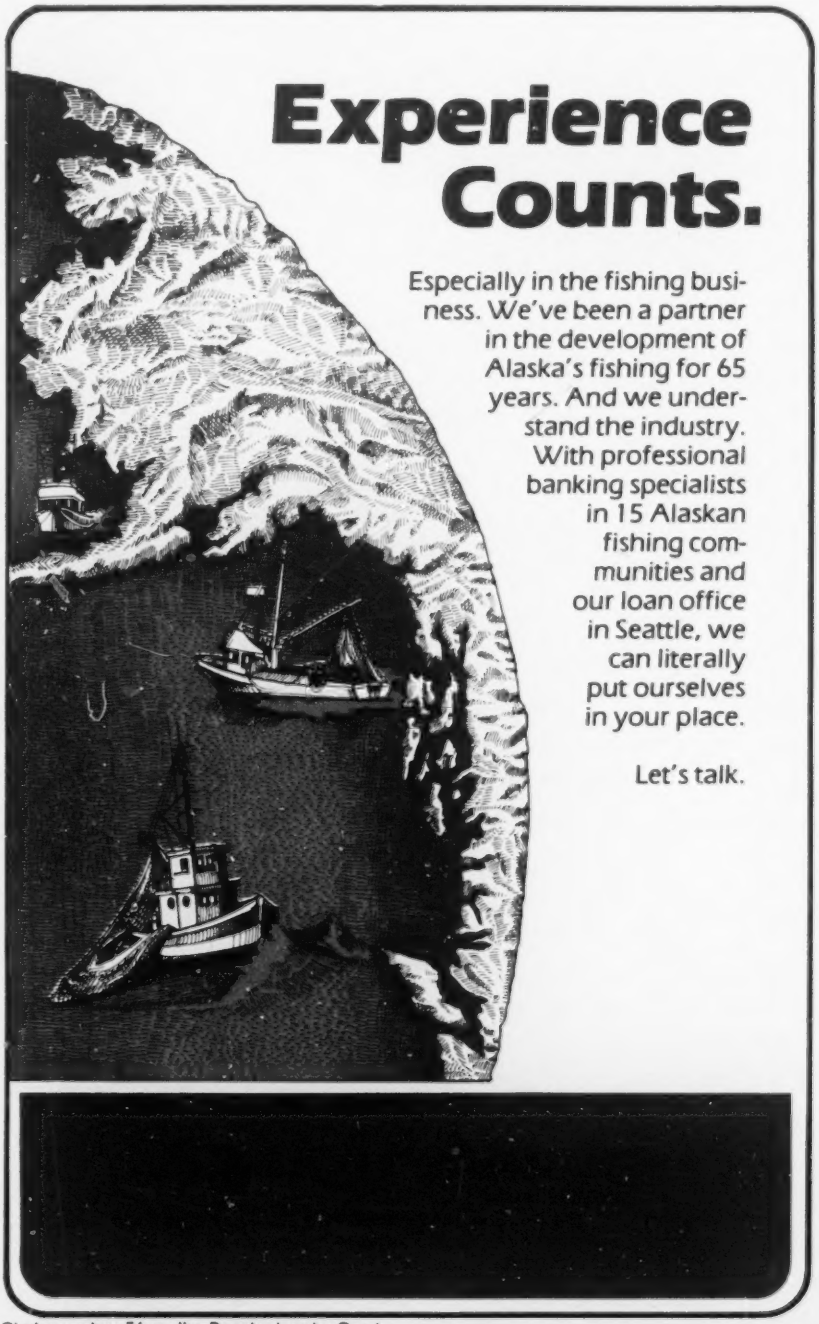
However, per capita consumption of fresh and frozen fish and shellfish has only increased six percent in the same time period, indicating a decisive shift in consumption from frozen to fresh seafood, a trend that is expected to continue. Restaurateurs are adjusting to the shift as they demand fresh, quality seafood first, a steady supply second, with price factors ranking third.

Hoping to take up the slack in the market for frozen portions and breaded and battered products, processors are developing frozen prepared entrees. Sales of quality, prepackaged, seafood entrees have doubled in the past six years as consumers increasingly turn to convenience items. The doubling in sales of prepackaged meals corresponds to a doubling of the number of two-income households between 1975 and 1980. Microwave ovens and frozen prepackaged meals go hand in hand as time-savers. Six out of 10 households are expected to own microwave ovens by 1990. Currently the number is 1.5 out of 10.

Surprising Salmon Pack

Salmon traders have a larger pack to sell than anticipated. Alaska landings are 30 percent above predictions, close to 110 million fish. Rather than the expected 25 percent decrease, the overall pack is only 10 percent lower than last year's. Processors will try to move the pack as quickly and efficiently as possible, in lieu of carrying inventories.

(MARKET EXPECTATIONS continued on page 10)


Experience Counts.
Especially in the fishing business. We've been a partner in the development of Alaska's fishing for 65 years. And we understand the industry. With professional banking specialists in 15 Alaskan fishing communities and our loan office in Seattle, we can literally put ourselves in your place.
Let's talk.

Circle number 56 on the Reader Inquiry Card

All you need to know about seafood products:

Pan-Alaska Fisheries
Bumble Bee Seafoods

Castle & Cooke Foods has brought you the finest seafood products for over 32 years. Our tradition of quality continues today with Bumble Bee® brand fresh, frozen, and canned Salmon, canned Tuna and Oysters, Dungeness Crab, and Pacific and Tropical Green headless Shrimp. And Royal Alaskan® brand King Crab, and Snow Crab. Quality products for consumer, foodservice, and industrial use. For more information and orders, write: Castle & Cooke, Inc., P.O. Box 3928, San Francisco, CA 94119. Or phone (415) 986-3000.

Circle number 16 on the Reader Inquiry Card

Alaska Salmon Landings

(THOUSANDS OF FISH)

		KING	RED	COHO	PINK	CHUM	TOTAL
Southern Southeast	1980	15.4	742.4	226.4	12,796.2	841.0	14,621.4
	1981	5.0	557.0	116.6	9,904.0	215.0	10,797.6
Northern Southeast	1980	6.1	375.1	202.8	1,419.2	797.6	2,800.8
	1981	5.3	306.7	33.2	4,554.0	213.7	5,112.9
Southeastern Troll	1980	299.1	2.9	706.5	267.5	12.2	1,288.2
	1981	245.0	10.0	600.0	600.0	10.0	1,465.0
Southeastern Total	1980	320.6	1,120.4	1,135.7	14,482.3	1,650.8	18,710.4
	1981	255.3	873.7	749.8	15,058.0	438.7	17,375.5
Prince William Sound	1980	8.7	230.2	325.0	14,233.0	477.7	15,264.6
	1981	21.4	795.4	90.4	20,085.9	1,884.9	22,878.0
Cook Inlet	1980	12.9	1,650.8	296.2	2,765.9	462.0	5,187.8
	1981	10.6	1,388.6	420.9	3,245.0	1,080.4	6,145.5
Bristol Bay	1980	95.7	23,674.1	301.5	2,649.6	1,406.4	28,127.3
	1981	238.9	25,712.7	253.0	7.2	1,474.8	27,686.6
Kodiak	1980	0.5	651.4	140.3	17,290.5	1,075.4	19,158.1
	1981	1.2	1,089.6	74.9	9,958.3	1,235.5	12,359.5
Chignik	1980	2.2	848.6	119.2	1,047.0	309.0	2,326.0
	1981	2.3	1,861.4	61.0	1,116.3	578.0	3,619.0
Alaska Peninsula	1980	22.0	4,992.2	339.0	10,730.9	2,049.9	18,194.0
	1981	27.8	3,864.9	136.1	5,148.7	2,355.7	11,533.2
Kuskokwim	1980	48.3	42.1	314.0	29.6	548.1	982.1
	1981	79.7	105.7	198.5	0.4	485.6	869.9
Yukon River	1980	152.9	—	8.7	—	1,358.3	1,519.9
	1981	158.9	—	21.6	—	1,570.3	1,750.8
Norton Sound	1980	6.3	—	30.2	226.7	182.4	445.6
	1981	7.9	—	23.7	232.4	172.8	436.8
Kotzebue	1980	—	—	—	—	367.3	367.3
	1981	0.1	—	—	0.2	677.3	677.6
ALASKA TOTAL	1980	670.1	33,209.8	3,069.8	63,446.1	9,887.3	110,283.1
	1981	804.1	35,692.0	2,029.9	54,852.4	11,954.0	105,332.4

Note: 1981 landings are through August 22, 1981. 1980 landings are for the year. Data are preliminary.
Source: ADF&G

British Columbia Canned Salmon Production

(48-LB. CASES)

	DOMESTIC PRODUCTION	FROZEN INVENTORIES	U.S. SALMON	TOTAL 1981	TOTAL 1980
Red	505,231	3,892	86,467	595,590	350,486
King	5,260	370	153	5,783	4,066
Coho	30,407	488	1,584	32,479	62,454
Pink	556,054	1,203	89,589	646,846	336,684
Chum	57,676	916	5,119	63,711	43,115
TOTAL	1,154,628	6,869	182,912	1,344,409	796,705

Note: Preliminary data through August 22.
Source: Department of Fisheries and Oceans, Canada.

Troll Salmon Landings

(THOUSANDS OF FISH)

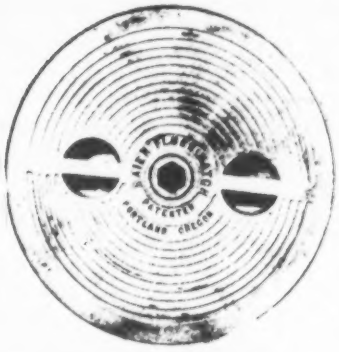
	KING		COHO	
	1980	1981	1980	1981
Alaska	210.9	227.7	369.8	420.8
Washington	118.7	107.7	315.8	292.1
Oregon	137.4	100.4	315.1	523.9
California	517.1	439.6	40.5	59.4

Note: Preliminary data through August 16. British Columbia landings in metric tons through August 1 — King, 1980: 2045, 1981: 1405; Coho, 1980: 2210, 1981:1272.

Source: Pacific Fisheries Management Council, ADF&G, Dept. of Fisheries and Oceans, Canada.

BAIER HATCHES

A WISE BUYER BUYS
BAIER HATCHES
tested and guaranteed watertight



OVER THE YEARS, WE HAVE LEARNED THAT PRODUCING A GOOD PRODUCT AND GIVING CUSTOMER SERVICE IS THE BEST ADVERTISING.

- Material: aluminum, bronze, galvanized steel.
- SAFETY: never iced in as the t-wrench is removable.
- TAMPER PROOF: you lock it and it stays locked until **you** unlock it.
- MAINTENANCE: only two moving parts.
- APPROVED AND USED: ABS, USCG, US Navy, Corps of Eng., Canadian Dept. of Transport
- SHAPES AND SIZES: flush round 8, 14, 16, 18, 20, 22, 24, ovals flush plain or hinged, 13½ x 20½, 15 x 24. Coamings available for all sizes.

We take this means of thanking our many customers for their past business and trust we can continue to serve you. For a *free* engineering catalogue write or phone:

L.S. BAIER & ASSOCIATES

7527 NE 33rd Dr.
Portland, Oregon 97211
503 287 8885

Eastern Representative: MAPECO
20 Vesey Street
New York, NY 10007

Circle number 9 on the Reader Inquiry Card

(MARKET EXPECTATIONS continued from page 7)

Unless interest rates decline, future price increases for canned salmon will be offset by inventory costs. The dollar's high value makes the pack expensive for European buyers, at roughly 20 percent above 1980 values. Processors may be forced to lower their price to the domestic market if foreign buyers cannot afford to absorb their share.

More salmon were directed to fresh distribution, with an even split between salmon canned and salmon processed fresh or frozen. Demand for fresh salmon was powerful this year, cutting into the frozen supply. The higher cost of airfreight over trucking is immaterial to the premium received for fresh product, which has an additional advantage of not needing to be financed inventory.

U.S. Cold Storage Holdings

(THOUSANDS OF POUNDS)

SPECIES	JULY 31, 1980	JULY 31, 1981
SALTWATER FISH		
Blocks and slabs		
Cod	23,683	22,233
Flounder	3,183	3,922
Greenland turbot	835	229
Haddock	5,227	5,238
Ocean perch	943	526
Pollock, Alaska	1,892	2,958
Pollock, Saithe and other	2,469	1,682
Whiting	11,536	7,803
Minced	4,234	6,293
Unclassified	3,829	3,091
Fillets and steaks		
Cod	25,788	21,075
Flounder	10,009	20,406
Greenland turbot	3,693	2,267
Haddock	5,763	5,670
Halibut	2,351	6,064
Ocean perch	9,059	8,000
Pollock, Saithe and other	4,647	2,423
Salmon	1,267	1,078
Whiting	2,818	2,083
Round, dressed, etc.		
Halibut	9,555	8,658
Sablefish	1,729	390
Salmon		
King	4,863	4,038
Coho	3,274	2,184
Chum	3,409	4,145
Unclassified*	5,454	6,025
Whiting, H & G	1,571	2,060
Unclassified	17,916	20,738
SHELLFISH		
Clams and clam meats	3,971	5,867
Crabs		
Dungeness (whole, sections, meat)	2,335	2,489
King: Meat	3,191	1,975
Sections (in shell)	5,136	9,703
Snow: Meat	1,640	1,367
Sections (in shell)	6,949	12,954
Unclassified	2,266	3,085
Lobsters		
Spiny (tails)	4,073	4,499
Unclassified (whole and meat)	2,800	1,848
Oyster meats	2,129	2,362
Scallop meats	3,577	6,032
Shrimp		
Raw, headless	19,306	22,773
Breaded	5,593	4,867
Peeled	15,594	14,021
Unclassified	12,229	7,727

Note: Includes imported frozen fish.
1981 data are preliminary.
*Includes all species of salmon.
Source: NMFS

The Japanese market for frozen and salted sockeye, while strong at the beginning of the run, has weakened — again due to the expensive U.S. dollar. Demand for salted chums by Japanese buyers is soft, partly due to forecasts for a strong run of fall chums off Hokkaido. The catch may exceed 1980's catch by eight percent.

King Crab in Demand

A limited king crab supply will enjoy healthy demand, especially in the domestic market. Landings may be half of last year's record catch unless quotas are increased. Projected landings total 77.5 million lbs., while last year the Alaskan fleet landed 174 million lbs. Distributors may be hard pressed to fulfill the demand developed to sell last season's catch, and most supplies will be sold to restaurants rather than retail outlets. Prices for king crab meat prior to 1981's season reached $10.50 per lb., up $3.50 from 1980 levels. More processors will put up meat to supplement low inventories because they will not be swamped with supplies as they were last year.

Restaurants are increasingly substituting king crab for lobster tails in their surf-and-turf entrees. Supply of lobster tails has fallen, and prices are up, another factor keeping king crab prices high.

Tuna Sales Down

Current promotions for light-meat tuna may generate results, easing full inventories and loaded freezers on board vessels backed up in the harbor awaiting a market. Consumers have resisted sharp price increases in canned tuna made earlier in the year.

Tuna is ranked high on the list of best grocery performers. Sales increased 45 percent over the norm during promotional sales. Most dealers are offering light-meat cases for well below list prices. A list price of $49-$51 drops to $37 for large orders.

Shrimp up for Promotion

Overall, demand is strong for higher priced seafoods. With the exception of shrimp, sharp changes are not expected. Shrimp is the perfect candidate for promotion during October's seafood campaign. While shrimp was dropped from menus more than any other item in 1980 because of its high cost, it should make a come-back this winter. Supplies are up 60 percent and the price is down 30 percent.

Canned Salmon: Supply, Stocks and Shipments

	1978-79	1979-80	1980-81	% CHANGE FROM ONE YEAR AGO
	(Basis 48 / 1 lb.)			
Carryover, June 1	785,894	643,612	515,271	– 20
Pack and imports to June 1	3,273,174	3,313,613	4,367,196	+ 32
Supply to June 1	4,059,068	3,957,225	4,882,467	+ 23
Stocks, June 1	643,612	515,271	570,284	+ 11
Shipments, May 1 to June 1	203,875	164,537	144,755	– 12
Shipments, June 1 to June 1	3,415,456	3,441,954	4,312,183	+ 25
	(Actual Cases)			
Carryover, June 1	1,120,211	964,487	741,290	– 23
Pack and imports to June 1	4,353,395	4,688,932	6,242,665	+ 33
Supply to June 1	5,473,606	5,653,419	6,983,955	+ 24
Stocks, June 1	964,487	741,290	744,267	0
Shipments, May 1 to June 1	303,344	247,161	184,206	– 25
Shipments, June 1 to June 1	4,509,119	4,912,129	6,239,688	+ 27

	U.S. STOCKS, JUNE 1			ACCUMULATED SHIPMENTS TO JUNE 1		
	1979	1980	1981	1979	1980	1981
48 / ¼ lb.	137,760	84,479	42,557	235,837	396,589	408,435
48 / ½ lb.	435,110	325,324	284,130	1,833,570	2,345,462	3,242,368
48 / 1 lb.	360,003	322,388	410,974	2,370,300	2,108,032	2,518,300
12 / 4 lb.	31,614	9,099	6,606	69,412	62,046	70,585
U.S. TOTAL	964,487	741,290	744,267	4,509,119	4,912,129	6,239,688

Source: National Food Processors Association

Bristol Bay Salmon Production

(ALL SPECIES)

	1980	1981	PERCENT CHANGE
Case pack (48 / 1-pound cans)	687,605	808,697	+ 15
Frozen and cured (pounds)	42,860,269	59,424,095	+ 28
Fresh exports by air (pounds)	26,225,470	22,187,653	– 18
Brine exports by sea (pounds)	27,780,210	21,485,815	– 29

Note: Preliminary figures
Source: ADF&G

Canned Salmon Prices

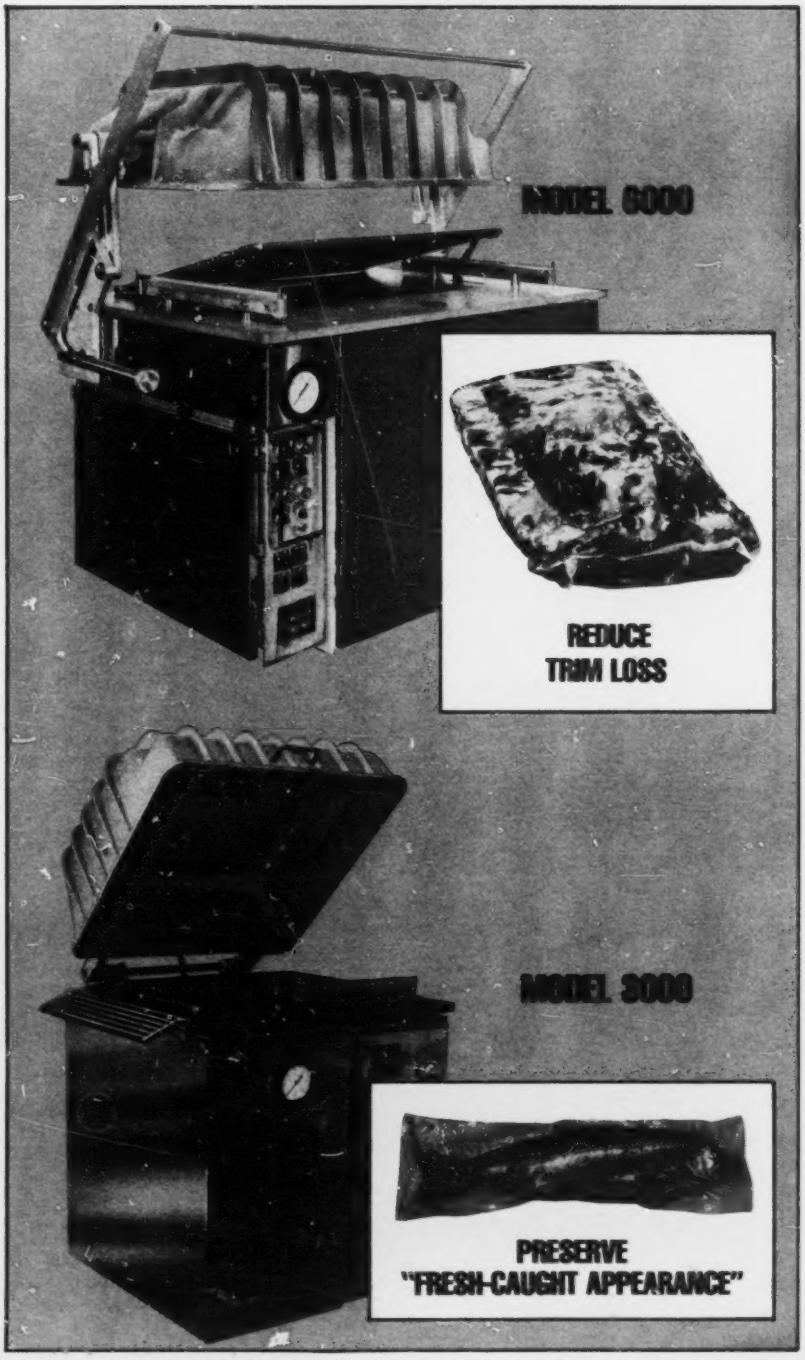
(DATA ON BASIS OF 48 CANS PER CASE)

	RED		COHO		PINK		CHUM	
	Talls	Halves	Talls	Halves	Talls	Halves	Talls	Halves
August 1980	$104-112	$67-76	$82-86	$48-54	$76-80	$42-46	$68-72	$36-42
August 1981	106-116	72-76	86-90	53-60	84-88	44-50	72-76	40-44

Note: All prices FOB Seattle.
Source: NMFS

National Fisherman
The Magazine of the Fishing Industry
$15 per year
21 Elm Street
Camden, Maine 04843

VACUUM PACKAGE
WITH LUDLOW MARKET PAK POUCHES AND EQUIPMENT SYSTEMS



A PROVEN PACKAGING ADVANTAGE FOR

BEEF — LAMB — PORK — VEAL — SAUSAGE — CORNED BEEF — FISH — CHEESE AND OTHER FOOD PRODUCTS THAT BENEFIT FROM OXYGEN EXCLUSION

LUDLOW'S HIGH PERFORMANCE POUCHES AND VACUUM SEALING EQUIPMENT

- Retains original quality far longer in sanitary packaging through high vacuum
- Protects natural oils, moisture and product appearance
- Preserves color, taste, and flavor during natural aging
- No metal clips required
- No water or steam required
- Reduces freight costs
- Provides accurate saleable product weights
- Prevents dehydration and freezer burn when frozen
- Automatic product unloading requires only electricity
- Modular plug-in electrical components
- Rugged; reliable; easily maintained; USDA approved

FOR FISH PRODUCTS

- Exclusive chevron-patterned sidseals for product loading
- Eliminates time-consuming glazing and re-glazing
- Shore or vessel installations

A DIVISION OF
Ludlow Packaging Ludlow CORPORATION

FINDING A BETTER WAY

"Our obligation to you"

For detailed information about Market-Pak Pouches and Packaging Systems, please contact any of these Ludlow Packaging Sales Offices.

Regional Sales Offices:

NORTHEAST REGION
Ludlow Packaging
145 Rosemary Street
Needham Heights, MA 02194
(617) 444-4900

METRO N.Y.C. REGION
Ludlow Packaging
Sutton 287
100 Davidson Avenue
Somerset, NJ 08873
(201) 560-1150

ATLANTIC REGION
Ludlow Packaging
P.O. Box 500
Paoli, PA 19301
(215) 647-0500

SOUTHWEST REGION
Ludlow Packaging
2828 Forest Lane
Dallas, TX 75234
(214) 620-7550

MIDWEST REGION
Ludlow Packaging
555 Butterfield Road - Suite 302
Lombard, IL 60148
(312) 960-2200

WESTERN REGION
Ludlow Packaging
5370 Manhattan Circle
Boulder, CO 80303
(303) 499-9811

Ludlow Packaging
A DIVISION OF Ludlow CORPORATION

Circle number 50 on the Reader Inquiry Card

Continental Tuna and Bonito Pack

JAN. 1-AUG. 7	1979	1980	1981*
	(1,000 Standard Cases)		
White meat	462	421	755
Light meat	7,655	8,169	7,334
Bonito	36	183	141
TOTAL	8,153	8,773	8,230

*Preliminary data
Source: NMFS

American Samoa, Puerto Rico and Hawaii Tuna Pack

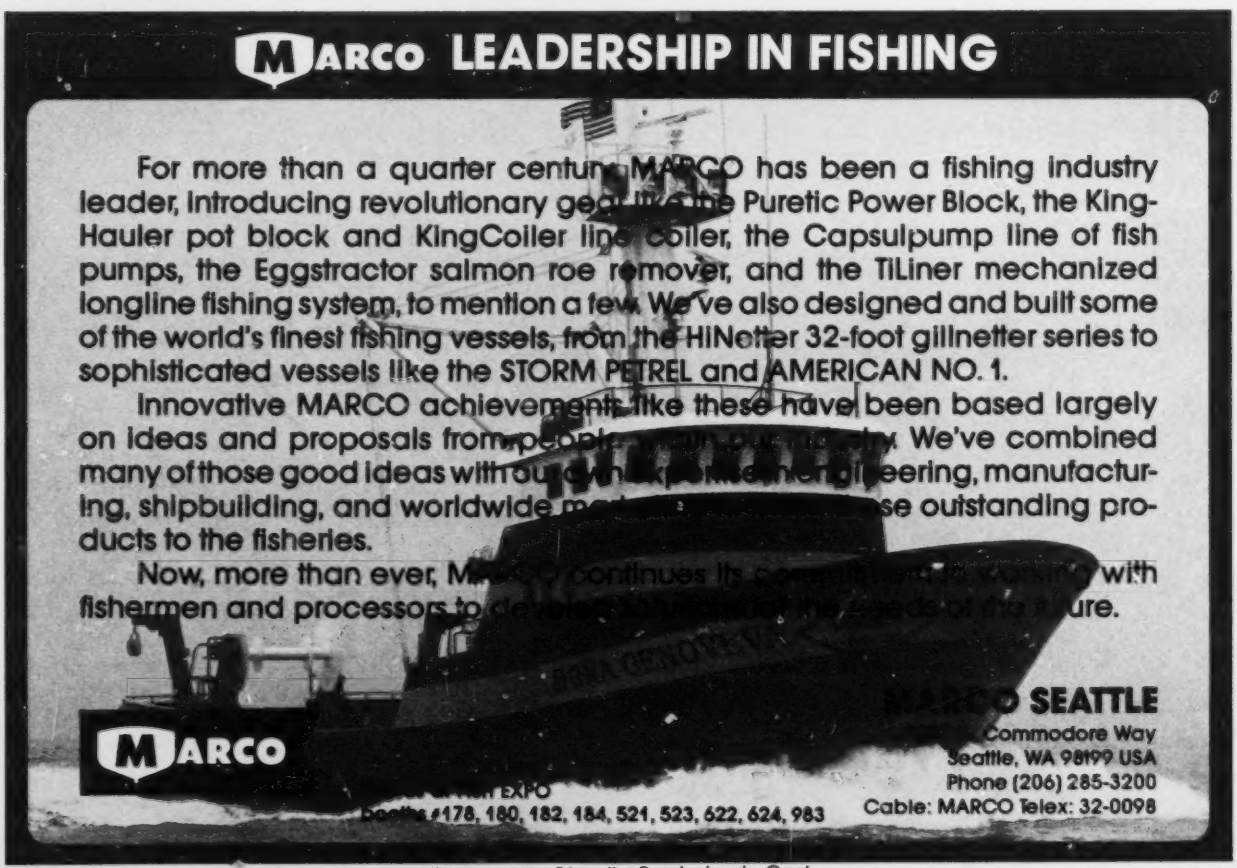
AREA AND PACK	JANUARY-JUNE 1980	1981
	(1,000 Standard Cases)	
Puerto Rico		
White meat	1,187	940
Light meat	3,258	4,620
TOTAL	4,445	5,560
American Samoa and Hawaii		
White meat	501	697
Light meat	1,364	1,768
TOTAL	1,865	2,465
GRAND TOTAL	6,310	8,025

Note: Preliminary data
Source: NMFS

California Canned Tuna Prices

CASE PACK	ADVERTISED LABELS 1980	1981	PRIVATE LABELS 1980	1981
	Dollars/Case		Dollars/Case	
TUNA, IN WATER				
White Meat, Solid				
3½ oz (48)	—	33.05-33.35	—	—
7 oz (24)	27.10-28.70	30.65-31.65	—	—
7 oz (48)	54.00-57.15	61.00-63.00	46.00-48.00	52.50-55.00
13 oz (24)	—	57.05-58.15	44.60-46.30	50.70-52.00
Light Meat, Chunk				
6½ oz (48)	44.00-49.00	51.00	38.00-39.00	38.50-40.00
12½ oz (24)	41.45-46.05	47.95	—	—
9¼ oz (24)	—	35.90-36.00	—	—
TUNA, IN OIL				
White Meat, Solid				
3½ oz (48)	—	33.05-33.35	—	—
7 oz (24)	27.55-29.15	31.10-31.65	—	—
7 oz (48)	54.85-58.00	62.00-63.00	46.50-48.50	52.50-55.50
13 oz (24)	—	—	46.10-46.90	50.70-52.60
White Meat, Chunk				
6½ oz (48)	47.25-49.95	53.90-54.90	45.00-47.00	—
Light Meat, Solid				
7 oz (24)	23.00-25.50	25.50-26.50	—	—
7 oz (48)	45.75-50.75	—	42.50-43.50	43.50-44.50
Light Meat, Chunk				
3¼ oz (48)	24.35-26.85	26.85-27.85	—	—
6½ oz (48)	44.00-49.00	51.00	38.00-39.00	39.00-40.00
9¼ oz (24)	31.40-34.50	35.90-36.00	26.70-27.00	27.40-28.45
12½ oz (24)	41.45-46.05	47.95	35.50-37.00	36.40-38.00

Note: Prices quoted in August FOB canners' terminal.
Source: NMFS


MARCO LEADERSHIP IN FISHING
For more than a quarter century, MARCO has been a fishing industry leader, introducing revolutionary gear like the Puretic Power Block, the King-Hauler pot block and KingCoiler line coiler, the Capsulpump line of fish pumps, the Eggstractor salmon roe remover, and the TiLiner mechanized longline fishing system, to mention a few. We've also designed and built some of the world's finest fishing vessels, from the HINotter 32-foot gillnetter series to sophisticated vessels like the STORM PETREL and AMERICAN NO. 1.
Innovative MARCO achievements like these have been based largely on ideas and proposals from people
We've combined many of those good ideas with our
engineering, manufacturing, shipbuilding, and worldwide
outstanding products to the fisheries.
Now, more than ever, MARCO continues its
with fishermen and processors to
MARCO SEATTLE
Commodore Way
Seattle, WA 98199 USA
Phone (206) 285-3200
Cable: MARCO Telex: 32-0098
MARCO
Booths #178, 180, 182, 184, 521, 523, 622, 624, 983
Circle number 51 on the Reader Inquiry Card

Pacific Shellfish Landings

(THOUSANDS OF POUNDS)

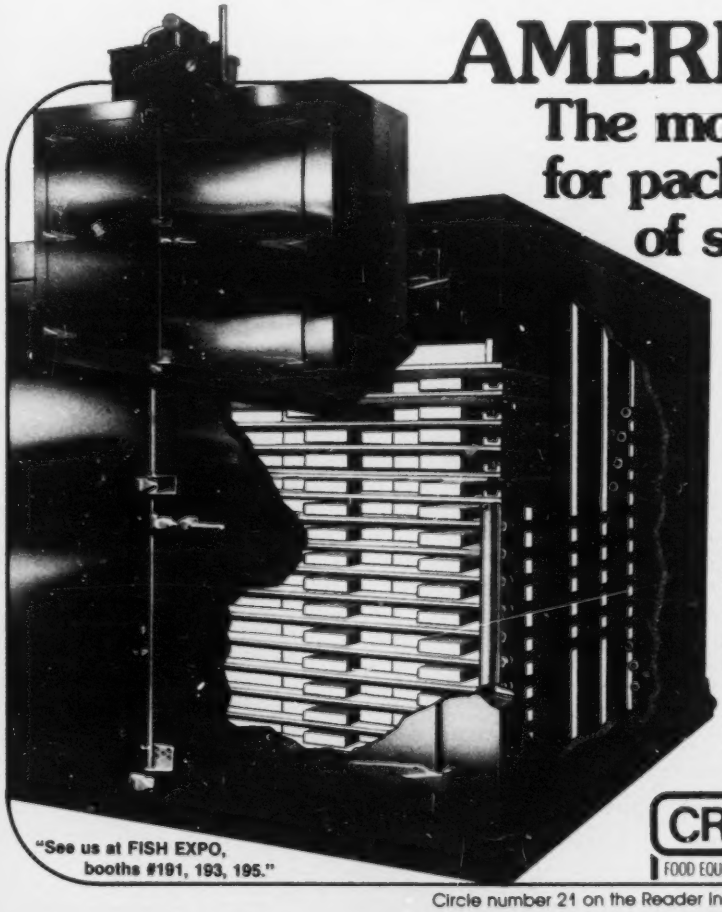
	PACIFIC SHRIMP	DUNGENESS CRAB
Washington		
January-June 1980	5,927.9	4,398.2
January-June 1981	6,404.6	1,299.9
Oregon		
January-May 1980		11,821.8
January-May 1981		3,353.4
January-June 1980	16,666.0	
January-June 1981	16,293.0	
California		
January-December 1980	4,440.0	6,211.0
January-June 1981	1,800.0	2,577.2
Alaska		
January-June 1980	5,512.1	952.8
January-June 1981	5,003.5*	5,038.5
	KING CRAB	**TANNER CRAB**
Alaska		
January-June 1980	2,873.7	117,502.6
January-June 1981	7,362.5	116,847.4

Note: Preliminary data.
*Nine million lbs. landed through August 23, 1981.
Source: NMFS

Alaska Shellfish Wholesale Prices

PRODUCT	CANS/CASE (Net Weight)	PRICE RANGE 1980	1981
		($/Case)	
Canned Crab			
Snow	24/7 oz fancy	73.00	62.00
Snow	24/6½ oz fancy	68.00	72.00
Canned Shrimp			
Tiny	24/4½ oz fancy	33.50	33.50
Tiny	24/4½ oz broken	31.00	31.50
		($/lb)	
Frozen Crab			
Dungeness meat	6/5 lb vacuum tins	3.50-4.25	7.00-7.25
King meat	6/5 lb cartons	6.80-6.90	10.15-10.50
King sections	20 lb cartons	3.90-4.15	3.70-4.00
Snow meat	6/5 lb cartons	4.75-5.40	5.50
Snow sections, large	20 lb cartons	1.75-2.20	2.45-2.50
Snow section, small	20 lb cartons	1.00-1.25	1.40-1.50
Frozen Scallops	10-20 lb blocks	—	5.50
Frozen Shrimp			
Tiny	6/5 lb IQF	4.00-4.40	3.00-3.65
Tiny	6/5 lb vacuum tins	4.35-4.45	3.00-3.65
Tiny	6/5 lb blocks	4.45	3.00-3.65
Tiny	12/1 lb bags IQF	4.55	3.90-4.10
Tiny	12/8 oz bags IQF	4.55	3.90-4.10

Note: All prices FOB Seattle as quoted in August.
Source: NMFS



AMERIO.

The more efficient freezer for packages or bulk trays of shrimp or fish filets.

- Cut day-to-day freezing costs an average of 20%.
- Maintain the product quality through fast, double contact plate freezing.
- Minimize the costs of investing in and maintaining freezing facilities.

Amerio Contact Plate Freezers are available in the capacities you need; in fully automatic, semi-automatic, manual and pilot plant models; with self-contained mechanical packages for use with ammonia or halocarbon refrigerants.

For more energy and cost saving data, write: CREPACO, Inc., 8303 W. Higgins Rd., Chicago, Ill. 60631 312-693-4000.

"See us at FISH EXPO, booths #191, 193, 195."

CREPACO
FOOD EQUIPMENT AND REFRIGERATION

Circle number 21 on the Reader Inquiry Card

BROKERS • EXPORTERS
MERCO
intertrade inc
IMPORTERS • PROCESSORS

Largest Processor/Exporter of Dogfish in North America

Other Products:

SALMON • BLACK COD • BOTTOM FISH
HERRING • UNDERUTILIZED SPECIES

SALES OFFICE
MERCO INTERTRADE, INC.
4215 21st AVE. W.
SEATTLE, WA 98199
(206) 282-5655
TELEX: 32-8432

PLANT
ARROWAC FISHERIES
P.O. BOX 1347
FERNDALE, WA 98248
(206) 384-4006
TELEX: 32-8432

Circle number 54 on the Reader Inquiry Card

Alaska-Shell, INC.

PRODUCTS

- Alaska King Crab
- Alaska Snow Crab
- Alaska Salmon (canned and frozen)
- Groundfish
- Herring
- Scallops
- Shrimp
- Specialty Products

PLANTS
6 locations; Eastern Bering Sea, Gulf of Alaska and Europe.

Over 200 years accumulated management expertise in seafood processing / marketing.
Also import-export of quality fishery products.

For Quality Foodservice Seafoods call:
Alaska-Shell, Inc., 4241 21st Avenue W., Seattle, WA 98199
(206) 285-3350 Telex: 328785 Cable: ALSHEL

Circle number 5 on the Reader Inquiry Card

THE BEEHIVE FISH DEBONER

SIMPLE • VERSATILE • DEPENDABLE • HIGH PRODUCTION

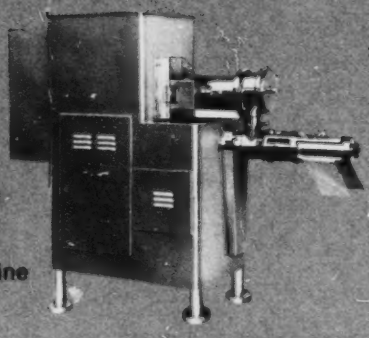
— Large Perforations Insure Good Texture

— Provides a High Production Rate

— Gives Maximum Yields on Whole Fish, Fillets, Frames, and Parts

— Fits Easily Into Any Production Line

— Removes Bones, Scales, Fins and Skin



Fish Type	% Meat	% Bone
Salmon Tails	70	30
Perch Frames	65	35
Halibut Trim	65	35
Halibut Frames	60	45
Cod V-Cuts	75	25
Cod Frames	70	30
Tuna Bones	60	40
Whole Bottom Fish	80	20

BEEHIVE MACHINERY, INC.

Stainless Steel Food Processing Equipment
Engineering and Consulting
Mechanical Deboners * Chillers * Grinders * Pumps

P.O. Box 5002, 9100 So. 5th West
Sandy, Utah, 84091
Phone 801-561-4211

Circle number 11 on the Reader Inquiry Card

1981 Halibut Landings

(THOUSANDS OF POUNDS)

AREA	CATCH LIMIT	LANDINGS
2A Wash./Ore.	200	165
2B British Columbia	5,400	5,400
2C SE Alaska	3,400	3,800
3A Gulf of Alaska	11,000	13,800
3B Gulf of Alaska	2,000	100
4 Aleutians	1,000	1,200

Note: Preliminary data, not including opening in area 2A from 9/15-9/19 and opening in 3B from 8/25-8/28.

Source: International Pacific Halibut Commission

California Herring Landings

(SHORT TONS)

AREA	GEAR	LANDINGS*
Crescent City	Gill Net	6
Humboldt Bay	Gill Net	43
Tomales Bay	Gill Net	448
San Francisco	Gill Net	2,972
San Francisco	Purse/Ring	1,544
San Francisco	Lampara	1,310

Source: California Dept. of Fish and Game
*Nov. 30, 1980 to March 31, 1981.

1981 Alaska Herring Landings

DISTRICT / GEAR	ROE HERRING (Short Tons)
Sitka Sound, purse seine	3,506
Lynn Canal, purse seine	775
Kah Shakes, gill net	1,840
Seymour Canal, gill net	619
Prince William Sound	
Purse seine	9,965
Gill net	235
Kodiak	
Purse seine	1,594
Gill net	469
Chignik, purse seine	447
S. Peninsula, purse seine	841
Togiak	
Purse seine	10,270
Gill net	2,268
Security Cove, gill net	1,173
Goodnews Bay, gill net	657
Cape Romanzoff, gill net	720
Norton Sound	
Gill net	4,138
Beach seine	39
	ROE-ON-KELP (Pounds)
Prince William Sound	
Pound	19,300
Divers	141,800
Togiak	378,200
Norton Sound	30,300

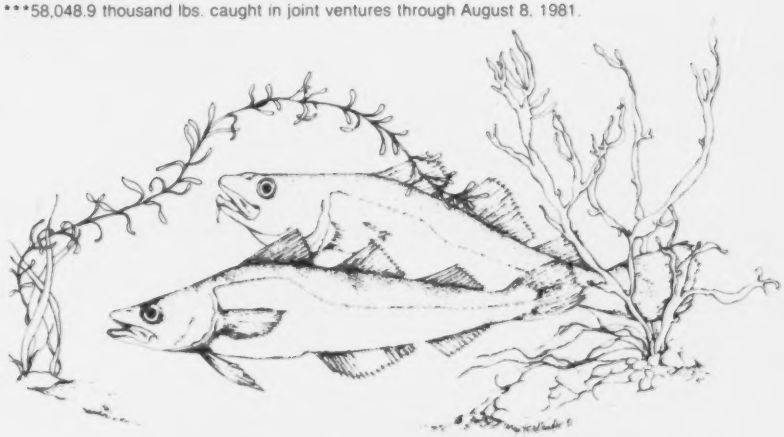
Note: Preliminary data.
Source: ADF&G

Pacific Bottomfish Landings

(THOUSANDS OF POUNDS)

	WASHINGTON		OREGON		CALIFORNIA	BRITISH COLUMBIA	
	1980 (through Aug.)	1981 (through Aug.)	1980 (through May)	1981 (through May)	1981 (through June)	1980 (through July)	1981 (through July)
Albacore	306.1	424.0	—	—	22.6	—	—
Dogfish	4,494.6	2,109.2	21.8	9.6	9.5	—	—
Cod, Pacific	8,727.7	9,991.8	71.0	34.4	—	14,663.2	10,854.7
Flounder	1,029.9	1,142.0	145.5	398.1	300.0	156.5	218.2
Halibut	2,868.3	2,698.4	4.4	—	—	3,462.5	1,002.8
Herring, roe	—	—	—	—	17,060.0	36,945.7	66,120.0
Lingcod	2,429.0	1,582.5	337.1	651.8	860.0	2,499.3	2,631.6
Pacific ocean perch	2,526.1	1,134.9	1,478.5	1,514.8	7.8	*	*
Pollock	810.1	1,728.3	—	—	—	4,178.8	1,787.4
Rockfish	22,226.8	19,694.0	11,185.9	24,427.8	13,000.0	13,322.5	14,178.3
Sablefish	2,651.6	3,173.8	1,742.5	1,901.2	3,600.0	2,730.8	2,838.7
Skate	109.3	139.2	104.6	47.3	165.0	502.5	403.3
Sole, Dover	3,734.2	3,109.1	2,435.3	3,855.1	8,600.0	7,610.4**	6,993.3**
Sole, English	1,775.0	1,248.1	523.8	609.3	1,475.0	—	—
Sole, Petrale	1,021.0	690.2	646.7	853.2	708.0	—	—
Sole, Rex	334.3	250.6	446.4	573.7	816.0	—	—
Sole, rock	344.4	281.7	43.5	2.3	—	—	—
Squid	—	—	—	—	21,683.0	—	—
Whiting***	—	—	—	—	—	—	775.8

Note: Preliminary data.
Source: State and provincial fisheries agencies.
*Included in rockfish data.
**Includes all sole.
***58,048.9 thousand lbs. caught in joint ventures through August 8, 1981.



Alaska Bottomfish Catch

(METRIC TONS)

TOTAL DOMESTIC CATCH THROUGH JUNE

SPECIES	BERING SEA	GULF OF ALASKA	TOTAL ALASKA
Pollock	27,237.2	17,239.8	44,476.6
Pacific cod	10,971.2	838.6	11,809.9
Sablefish	4.7	424.7	429.5
Flounder	6,665.4	65.7	6,731.5
Rockfish	7.7	162.1	169.9
Atka mackerel	1,490.3	—	1,490.3
Other/unspecified	1,122.7	211.1	1,334.3
TOTAL	47,499.2	18,942.1	66,442.1

Note: Domestic catch includes joint venture catch. Preliminary data.
Source: ADF&G

JOINT VENTURE CATCH THROUGH AUGUST 8

SPECIES	SOVIET UNION	WEST GERMANY	SOUTH KOREA	POLAND	JAPAN (Taiyo)	JAPAN (Nippon Suisan)
Pollock	13,508.0	—	23,857.0	2,000.0	5,252.0	6,200.0
Pacific cod	4,300.0	N/A	—	—	43.0	—
Yellowfin sole	10,825.0	—	1,200.0	—	—	—
Atka mackerel	1,050.0	—	—	—	—	—
Other/unspecified	—	—	—	—	20.0	300.0
TOTAL	29,683.0	—	24,787.0	2,000.0	5,315.0	6,500.0

Note: Preliminary data.
Source: Joint venture representatives.

Canned Salmon Brands Undergo Consumers Union Taste Test

The three-million-member Consumers Union took a rare look at a seafood product in the August issue of *Consumer Reports*, rating 33 brands of canned red, pink and chum salmon.

Consumers Union tasters tried six samples of each product and rated products on the basis of sensory judgments of flavor, aroma, texture, saltiness, overcooking and oil content. In all, 17 brands of red salmon, 12 of pink and four of chum were tested.

While the Union's tasters found a considerable variation among brands, the article in *Consumer Reports* did a respectable job of explaining why variations are inevitable in the salmon fisheries of western North America, given the biology of salmon and the challenges of the fishing and processing operations.

"For salmon lovers," *Consumer Reports* says, "the variations mean that you can't expect every can of salmon to taste just like the one before. But if you stick with the highest-rated brands, just about every can should be — well, very good."

Consumers Union found the average cost of red salmon to be 91 cents per three-ounce portion (based on fall 1980 retail prices), which puts it in the same league with the better cuts of beef. There were exceptions, however. One was *Food Club Red*, one of the top five-rated products, which priced out at only 72 cents per portion, comparing very favorably with the better grades of canned tuna.

Other Consumers Union conclusions: Tasters rated none of the brands excellent, but rated five brands very good. All five of these brands were red salmon, but the other 12 brands of red salmon were scattered down through the ratings, mixed with less expensive pink and chum salmon.

Whitney's Pink, at 54 cents a portion, was singled out as a good buy and it was rated above most brands of red canned salmon. Whitney's also received honors with its chum, rated the least expensive and the best of that species.

The information above is copyright 1981 by Consumers Union of the United States, Inc., Mt. Vernon, N.Y., 10550. It is excerpted by permission from Consumer Reports, *August 1981. This material may not be used for any advertising or commercial purposes. It has been granted for legitimate educational or non-commercial informational purposes.* □

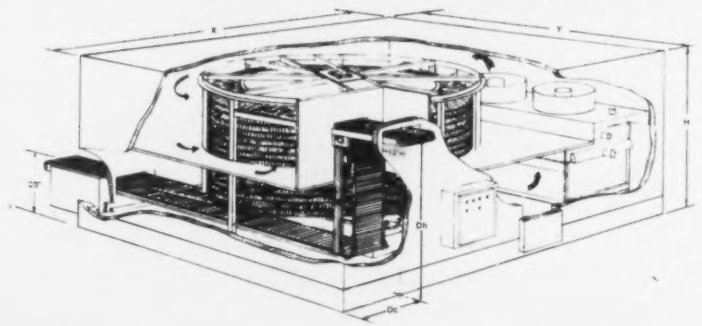
Ralston Purina Reorganizes Van Camp Sea Food Co.

The tuna fishing, canning and marketing operations of the Van Camp Sea Food Co. in San Diego have been reorganized by the parent company, Ralston Purina in St. Louis.

San Diego observers expect the move to have a depressing effect on Van Camp's sales, which were already being overshadowed by Star-

IQF FREEZERS

Fillets ★ Shrimp ★ Scallops



SPIRO-FREEZE is a total system designed to match the application requirements. The SPIRO-FREEZE is a truly versatile freezer for handling delicate products such as fish fillets and fish cakes.

• SPIRO-FREEZE — Spiral Freezer for IQF Fillets Patties or Portions

• UNI-FREEZE — Tunnel Freezer for IQF Shrimp and Scallops

• BRINE FREEZER — Crab Shrimp Salmon

FREEZING SYSTEMS, INC. 206 881-1978

Freezing Systems also offers FOS-KIT for phosphate treatment of shrimp — Improves yield 50%.

16615 Redmond Way, Suite 203 • Redmond, WA 98052 • (206) 881-1978

Circle number 34 on the Reader Inquiry Card

Kist Foods, a subsidiary of Heinz in Pittsburgh. Star-Kist is headquartered in Terminal Island, Calif., but also has fleet operations based in San Diego.

In reorganizing Van Camp's operations, Ralston Purina moved the market, finance and distribution functions to St. Louis, and left intact in the San Diego headquarters only the procurement, production and quality assurement departments. In other words, only the fishing and canning operations.

Ralston Purina also put a stop to the practice of selling canned tuna through brokers. This responsibility was turned over to the company's sales force that handles pet food and other products.

As the summer was drawing to an end, all the tuna canneries in Southern California were feeling the pinch of a downturn in sales. Bill Horner of Del Mar's Marine Service Enterprise blamed it on high interest rates. "They're killing everybody," he said.

While the canneries sought to reduce inventories, tuna boats coming in were delayed at the dock in unloading, in some instances by two or three weeks. □

Americans Eat More Fish and Less Beef Than Numbers Tell

Americans have a number of misconceptions about patterns of food consumption, and one concerns the importance of seafood in the American diet.

Americans frequently read and hear that they consume about 250 lbs. of red meats and poultry and only 13.4 lbs. of fish (about 5 percent) each year. The importance of fish in the American diet is about double what those numbers indicate, according to data provided by R.J. Hasiak, an extension food technologist at Iowa State University.

The 120.5 lbs. of beef reportedly consumed on a per capita basis is actually weight of beef in carcass form. By the time it reaches the table, trimming, boning and cooking reduce that number to an *actual* consumption of only 43.8 lbs.

The 13.4 lbs. of seafood reported consumed on a per capita basis actually is seafood in finished product form, usually uncooked. Trimming and cooking reduce seafood actually consumed to 9.7 lbs. per capita. And that represents about 9.4 percent of the total American per capita consumption of red meat, seafood and poultry.

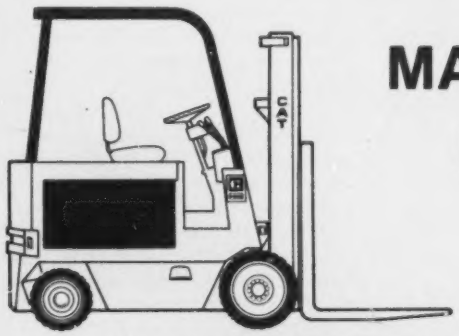
Seventy-two percent of the reported per capita consumption of fish is actually consumed, leading the list of beef, poultry and fish. Only 36.4 percent of reported beef per capita consumption actually is consumed. Seafood also leads chicken (41.1 percent of reported consumption is actually consumed) and pork (40.9 percent of reported consumption is consumed). □

PER CAPITA CONSUMPTION

Item	Reported (lbs.)	Consumed* (lbs.)	Percent
Beef	120.5	43.8	36.4
Pork	61.4	25.1	40.9
Chicken	47.7	19.6	41.1
Seafood	13.4	9.7	72.0
Turkey	9.4	4.4	46.8
Veal	3.0	0.7	23.3
Lamb	1.6	0.5	31.3

*Weight actually consumed after trimming, boning and cooking.

Note: Data are derived from figures of the U.S. Department of Agriculture.



MATERIAL HANDLING EQUIPMENT FOR SEAFOOD

- Caterpillar Electric Lift Trucks
- Prime-Mover Low-Life Electric Pallet Trucks, Narrow Aisle Lift Trucks
- Lion Liftall Rough-Terrain Lift Trucks, Elevator Masts for Processing Ships

RENT, LEASE, BUY: NEW, USED

NC N C MACHINERY CO.
BRANCHES IN WESTERN WASHINGTON AND ALASKA

YOUR CATERPILLAR LIFT TRUCK DEALER

"See Us At FISH EXPO Booths #6426, 6428"

Seattle 206-764-3200
Tacoma 206-383-3068
Anchorage 907-278-1531

Circle number 57 on the Reader Inquiry Card

Boston Refrigeration Conference Stimulates Debate

Two themes characterized continuing debate at the conference on "Advances in Technology in the Chilling, Freezing, Processing, Storage and Transport of Fish, Especially Underutilized Species," sponsored by the International Institute of Refrigeration. One concerned the argument over freezing only high-quality fish versus freezing fish unsuitable for the fresh market. Optimum frozen storage temperatures was the subject of another debate.

The consumer's perception of frozen fish being inferior to fresh fish is due partly to processors' waiting to freeze until after fish is unsuitable to sell fresh, argued some participants. On the other side, people experimenting with extending the shelf life of fresh fish through proper temperature control, handling and packaging felt that after a certain number of days, during which the product was suitable as a fresh fillet, it should be frozen while still marketable as good-quality frozen fish.

The debate over the optimum storage temperature for frozen fish revolved around whether the standard temperature should be minus 30 degrees C. Some people felt that at temperatures higher than minus 30 degrees C significant deterioration in quality begins to take place, and the extra insulation and energy requirements for colder storage are worth the benefits in terms of improved product quality and storage life. In fact, many would like to see storage at temperatures well below minus 30 degrees C. Others felt that such a temperature is impractical economically, because, first, these facilities do not exist in the U.S. to any extent, and secondly, the benefits of going to the lower temperature are not significant.

Over 340 delegates from 34 countries attended the IIR meeting, one of the largest to be held in the past 10 years, according to A. Gac, director of the IIR. Many of the 73 papers presented dealt with specific experiences of refrigerating or freezing fish in countries that have widely different facilities and fisheries problems. The presentations were useful for obtaining an overview of the problems in developing refrigeration and freezing technology but did not cover significant new developments.

Whether research discussed represented new breakthroughs in freezing and chilling technology and its applications or whether much of the work was simply extending similar efforts undertaken during the past 20 years was discussed on the final day of the conference. One industry participant commented on the difficulty he had experienced in learning new practical technology.

Interesting observations about the energy intensiveness of bottom trawling were made in the keynote speech by Gustav Lorentzen, president of the IIR General Conference. In most fishing operations, the energy intensity of food production, measured as a ratio of input to output, is consistently less than 1.0. More energy is expended in catching the fish than exists in the food value of the fish themselves. In the production of frozen cod fillets in Norway, the ratio of food energy produced to total energy used in production is extremely low. Using as an example a typical freezing plant with a capacity of 8000 tons a year, he calculates that 67 percent of the total energy is used offshore in harvesting, while the remaining 33 percent is used in processing, transportation and distribution.

"If one includes the cooking losses in the final preparation and serving [of cod fillets], it is doubtful if more than 2 percent remains of the total energy expended. This is probably the poorest yield of any major food product, possibly with the exclusion of hothouse tomatoes and cucumbers."

By comparison, reduction fisheries, where the product is used to produce oil or fish meal that becomes animal feed, have a much better ratio of recovered food energy to total energy expended.

Lorentzen raised these points to suggest that in an era of increasing energy scarcity, the high energy cost of traditional fisheries may undermine attempts to increase food production from the seas, unless fishing and processing methods are substantially revised.

An analysis of the costs of distributing frozen food to the retail market was made by Per-Oskar Persson, of Frigoscandia, Sweden. Between 1970 and 1980, product cost declined as a percent of total costs, while packing and transport costs increased significantly. A table from his paper is reproduced below:

COST CATEGORY	1970	1980
Product	78%	65%
Freezing	2%	3%
Packing	8%	12%
Transport and Distribution	12%	20%
Total	100%	100%

"Chilling and Freezing Seafood," the first technical session, concentrated principally on testing methods, procedures, and equipment to measure changes in fish quality during chilled storage. Dr. R.G. Poulter, of the Tropical Products Institute in London, reviewed literature showing that some tropical fish have markedly longer shelf life under chilled storage than do temperate-water fish. One possible mechanism for this may be the reaction of tropical bacteria to colder temperatures — they may not be able to function. Poulter discussed the fact that certain species of tropical fish go into a "cold shock" upon chilled storage. Processing and handling procedures designed for temperate fish species cannot automatically be applied to tropical fish.

Jurgen Baumgart, of Cryoquip, Inc., analyzed the cost of a low temperature (minus 65 degrees C) versus a conventional minus 30 degrees C freezing system. He pointed out that the capital costs of the two systems are about the same, with the cost of floor space for a low-temperature system being less because the freezer requires less volume. Power requirements for a low-temperature system are about 60 percent greater than for the minus 30 degrees C system. Although product quality will be superior in a low-temperature system, the economic value of quality cannot be determined.

The session entitled "New Products, Packaging, and Analytical Criteria" included several papers on the problem of the textural toughening of red hake and the possibilities of overcoming this toughening to produce commercially acceptable frozen products. Several of the papers reported on work carried out under the sponsorsip of the New England Fisheries Development Program to identify the actual toughening mechanism and to determine under what circumstances this process could be inhibited or reversed. A

(REFRIGERATION cont. on p. 65)

ConAgra Sold on Seafood

When ConAgra, Inc., a large Omaha-based agribusiness company, decided to jump into the seafood business, it did so with both corporate feet.

Last February, ConAgra acquired Singleton Packing Corp. of Tampa, Fla., for approximately $10 million and assumption of some long-term debts.

By mid-summer, ConAgra made a second acquisition, this time on the West Coast. Sea-Alaska Products, Inc., one of the largest producers of king and snow crab, was acquired from its nine shareholders for 750,000 shares of ConAgra common stock worth approximately $14 million. Major shareholders were Robert E. Resoff, founder and president, and Robert J. Bugatto, vice president.

"All of a sudden we have put our money where our mouth is," says Warren J. McCoy, ConAgra's vice president of public relations. "We really believe in seafood."

ConAgra became interested in the fish and seafood business a decade ago when it entered the farm-raised catfish business in the South. Today, it is the largest producer of farm-raised catfish, with an annual production of about 10 million lbs., sold under the Country Skillet label.

The Omaha firm is also big in the poultry broiler industry, producing about 430 million lbs. annually under its label and another 150 million lbs. annually under Banquet Foods Company, which it acquired last November. Its poultry production puts ConAgra among the top 10 producers in the nation.

ConAgra anticipates increases in consumption of both poultry and seafood. "Per capita consumption [of poultry] is increasing at the expense of red meat and pork," says McCoy. "Per capita consumption of fish is far behind, but there is a lot of room to grow."

Any other entries into the seafood industry, McCoy says, "will be like the ones we have made, buying well-run companies, but buying particularly where we have evidence of strong management."

In addition to poultry and seafood, ConAgra is a flour miller and a major producer of agricultural chemicals and frozen foods. With its new seafood acquisitions, ConAgra had sales for the fiscal year ending in May of $1.377 billion. Total company employment is 12,000. □

Japanese Survey

Supermarkets in Japan sell more and better fresh fish than do other retail outlets such as specialty seafood shops or local grocery stores, according to a recent survey commissioned by the Japanese Ministry of Agriculture, Forestry and Fisheries.

Economies of scale allow supermarkets to stock larger quantities and more varieties of fish than other retail stores, and supermarkets turn over inventories more quickly.

The average supermarket in Japan sells more than $450,000 of fish yearly, compared to $90,000 in sales by smaller specialty shops and local grocery stores. □

Tuna Tally

Star-Kist Foods has taken the lead in the competition for the major share of the U.S. tuna market, while Van Camp Sea Food Co. appears to be gradually falling further behind.

Bill Horner, president of Marine Service Enterprise of Del Mar, Calif., recently assessed the status of the market for *Pacific Packers Report.*

The market percentages, he reminded, are approximate and subject to fluctuations.

Star-Kist had a commanding lead with 34 percent of the market share, while Van Camp lagged with 31 percent.

Star-Kist, a subsidiary of H.J. Heinz, registered new gains this year when it acquired Canadian Maid Foods, Canada's largest canned tuna producer, and all of Sun Harbor's brands, notably its "Breast O' Chicken" label.

Other companies in the tuna industry and their market shares include Bumble Bee Foods, 13 percent; C.H.B. Foods, 11 percent; Sun Harbor, 4 percent; MIC (Mitsubishi International Corp. and its 3 Diamond brand), 3 percent; Neptune, 2 percent; and imports, about 5 percent.

The above report pertains to total output. Market shares by brands follow a similar pattern with minor variations. They are as follows: Star-Kist, 33 percent; Van Camp, 30 percent; Bumble Bee, 11 percent; 3 Diamond, 3 percent; and Neptune's Empress, 1 percent.

This is 78 percent of the market. All the other private labels amount to the remaining 22 percent. □

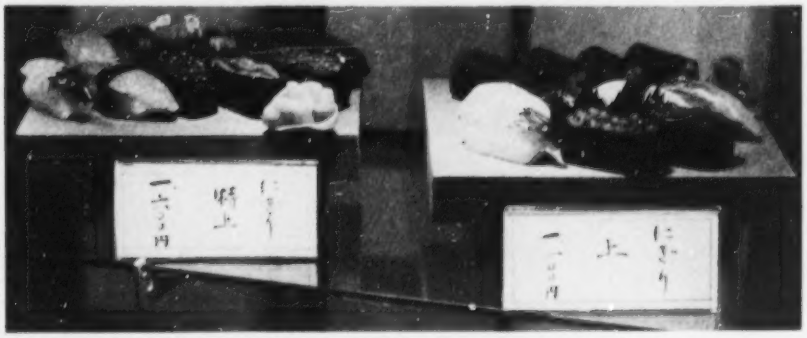
The finest frozen seafoods from Puget Sound

Shearwater Seafood

Packed by Independent Fishermen's Packing Co., Inc., Anacortes, WA 98221 USA
Phone: (206) 293-9522 *Telex: 15-2980*

Circle number 41 on the Reader Inquiry Card

Observer Impressed by Seafood Marketing in Hokkaido



TIM JOYNER

A tempting display of sushi graces a Japanese restaurant window.

The size and vigor of the Japanese market for seafood has, for a long time, been a source of wonder and envy to Americans concerned with the marketing of fishery products. The American seafood processing industry has often offered as an excuse for its traditional shakiness the argument that Americans simply aren't fish eaters. A common corollary to this argument is that extra investment in marketing is money down the drain.

To this observer, now living in Ebetsu (a prosperous Hokkaido community of 80,000 situated 20 kilometers from the modern, bustling prefectural capital of Sapporo, a city of 1.3 million), those arguments are as immaterial as the one over which came first, the chicken or the egg? For as surely as there is a huge domestic seafood market in Japan, a nation of fish eaters, it is also evident that the seafood industry here is very competitive. Marketing is a major aspect of that competition, and the efforts to improve and update seafood marketing practices are continuous and intense.

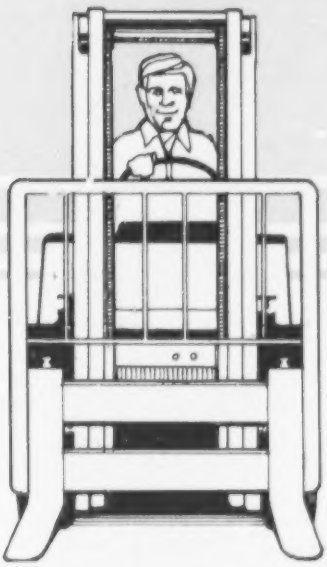
A major feature of marketing in Japan is the attractive visual presentation of seafood's great variety of products. The results of this effort are absolutely stunning, mouth-watering displays of seafood on supermarket shelves and in the windows of eating establishments. Fishery products of every conceivable edible variety are artfully arranged and packaged to present a powerful visual impact, calculated to stimulate the appetite of even the most sales-resistant prospective customers.

An American beef eater who normally would be repelled at the thought of eating an octopus or a mess of squid cannot help but be intrigued by the eye-catching, colorful arrangements of such wares in convenient, easy-to-prepare packages on spotlessly clean, refrigerated supermarket shelves. Nor could he resist mouth-watering displays of model dishes containing seafood in the windows of restaurants, sushi bars and noodle parlors. Aside from the convenience of the packaging, the most effective techniques used here for the presentation of seafoods on supermarket shelves must surely be the artful use of color and design in their arrangement. It was surprising to see how what would have been, in an American market, merely a mess of slimy squid, repulsive-looking octopus tentacles and unprepossessing cuts of very ordinary bottom "trash" fish can be made to appear visually attractive and appetizing on Japanese market shelves. That a great deal more thought and effort is being applied to the marketing of seafood in Japan than is customary with the seafood industry in the United States, is obvious to any thoughtful observer. One cannot help but think that an increased effort on the part of the American seafood industry to present to its prospective consumers visually attractive, appetizing displays of conveniently packaged seafoods would do much to stimulate a gratifying expansion of the domestic demand for fishery products. For American seafood marketing experts, there are many useful lessons to be learned in Japan where the marketing of seafood has been developed to a fine art by a fiercely competitive industry. □

— Tim Joyner

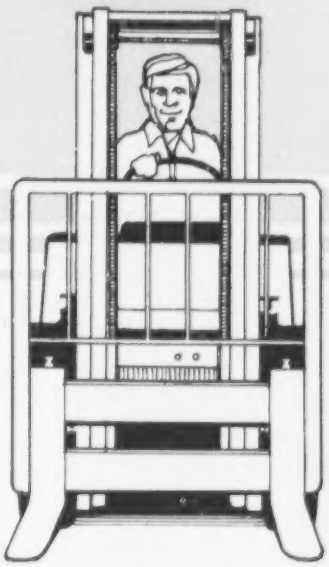
Circle number 58 on the Reader Inquiry Card

This Toyota features the new "Toyota-Vision" mast.



New "Toyota-Vision" mast gives complete picture window visibility through the lift truck upright. Now available on any Toyota lift truck — gas, diesel, or electric (2,000 lb. - 15,000 lb.)

This Toyota features the industry's best value!



Toyota delivers more than your money's worth! And that's true on any Toyota lift truck . . . 1200 to 33,000 lb. capacities; pneumatic and cushion tires: electric, diesel and gas models.

NEW IN 1981:
PNEUMATIC TIRED ELECTRICS
1,200 lb. to 6,000 lb. capacity

Get both with proven Toyota operating economy.

Toyota lift trucks cost less to buy or lease
. . . cost less to operate . . . cost less to maintain.

Backed by Toyota's Excellent Warranty and
CB Equipment Company's Exclusive "No-Risk" Guarantee.

CB EQUIPMENT COMPANY

The Northwest's only authorized Toyota distributor.

Portland:
10 S.E. Taylor St. ▪ Portland, Oregon 97214
503/235-8625

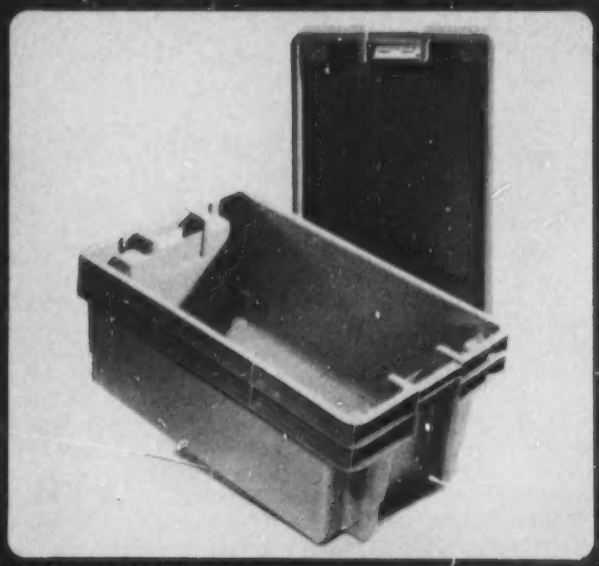
Seattle:
19640 78th Ave. S. ▪ Kent, Washington 98031
206/872-7114

Albany:
2300 Ferry St., S.W. ▪ Albany, Oregon 97321
503/928-4486

Circle number 17 on the Reader Inquiry Card

Go Ahead with IPL tough fishing containers and floats

Complete line of packaging pails with tight fitting lids from 5 litre (1.3 U.S. gal.) to 27 litre (7.1 U.S. gal.) volume.



Nest'em or stack'em
Wide range of durable fish boxes available from 20 litre (5.3 U.S. gal.) to 75 litre (19.8 U.S. gal.) volume.

Brand new series of stackable shipping fillet boxes for packaging of 10 lb. (4.5 kg), 20 lb. (9.1 kg) or 25 lb. (11.3 kg) fish fillets.

"See us at FISH EXPO booths #6122, 6124"

Leak-proof fishing floats designed to provide maximum protection and tested under hydraulic pressure to verify their quality.

At last... Plastics specifically designed to meet the needs of the fishing industry and shipped directly from our local warehouse.

CALL US AND LET US KNOW YOUR REQUIREMENTS

IPL®

IPL PRODUCTS, LTD

65-D Wharf Street, Pickering Wharf
Salem, Mass. 01970
Tel. (617) 745-8315

Hwy 9 North, P.O. Box 501
Plattsburgh, N.Y. 12901
Tel. (518) 561-8260 - Telex 93-7497

Circle number 45 on the Reader Inquiry Card

Seafood Business

Puerto Rican Tuna Cannery Sold to Mitsubishi

SAN DIEGO, CALIF.—The Puerto Rican tuna cannery of Westgate-California's Sun Harbor Industries has been sold to Mitsubishi for an undisclosed sum.

The plant was the last major asset of C. Arnholt Smith's bankrupt financial and industrial empire. Westgate's court-appointed trustee, Herbert Kunzel, said the sale includes the 150,000-square-foot plant on eight waterfront acres in Ponce, Puerto Rico, and Sun Harbor's headquarters and marketing office in San Diego. Marine Service Enterprise represented the seller.

Westgate sold its Sun Harbor cannery in San Diego two years ago to Castle & Cooke, parent company of Bumble Bee Foods. The price was $9.6 million.

Trademarks to Westgate's canned seafoods were sold to Star-Kist Foods last December.

The Ponce cannery was built in 1971 to ease the delivery of catches made too far from Westgate's canneries in San Diego and Terminal Island.

The Puerto Rican plant currently is producing private-label products. Mitsubishi is expected to continue the canning operation and to retain most of Sun Harbor's 800 employees.

Westgate had been in a Chapter 10 reorganization, and the cannery sale climaxed the dismantling of Smith's far-flung empire after his U.S. National Bank was declared insolvent and closed eight years ago.

Kunzel said that after officials of Ponce and Puerto Rico approve the sale, as expected, Mitsubishi will own nearly all of Sun Harbor's assets. Westgate will retain the accounts receivable and an interest in three tuna purse seiners.

Westgate earlier this year sold its airline, Air California, to two developers in Orange County, California, for $61.5 million.

Kunzel, who also has acted as chairman and president of Westgate, said the formerly bankrupt company will now be able to return its 100,000 shareholders 100 percent of what they paid for the stock. □

USDA Labeling Changes May Set Precedent for Seafood

A dispute between poultry processors over the labeling of deep-chilled products was settled and could have some implications for the seafood industry. The U.S. Department of Agriculture issued the following policy statement: "A poultry product with a thin ice crust, while not permitted to use label claims such as 'not frozen,' may be labeled as 'fresh' since the crust formation is an inadvertent result of permitted chilling procedures." Deep-chillers allow poultry to equilibrate at 28 degrees F after reducing its temperature as low as minus 40 degrees F. Although the fluids freeze, processors deep-chilling claim the flesh remains unfrozen.

Minced products will receive a boost from an upcoming change in the labeling of mechanically deboned meat. Rather than referring to bone content as finely powdered bone, it may be listed as calcium on the label, if the current USDA proposal receives approval. Marketing minced products may be made easier by the change. □

SEAFOOD BUSINESS

continued on page 65.

Andy Arntsen, Owner/Skipper, Shelikof Strait

We'll treat your boat like one of our own.

FOSS Dillingham

Foss Shipyard

660 W. Ewing St., Seattle, WA 98119
(206) 281-3872 or 281-3800

"Without the quick action of Foss Shipyard, we would have lost several hundred thousand dollars..."

When the rudder was destroyed on the 176-ft. fishing vessel "Shelikof Strait" near Kodiak, Skipper Andy Arntsen was faced with a lay-up through the fishing season.

"I explained our problem by phone to Wally Barber, Superintendent at Foss Shipyard," Arntsen said. "In a short time, they fabricated a new rudder and had it air-freighted to Kodiak where it was installed by divers. We were overwhelmed by the fast service and quality of the job. We didn't lose a day of fishing and it could have cost us a half a million dollars."

We're proud of our repair specialist team with the skills and personal attention necessary to handle emergencies . . . every day, around the clock, weekends and holidays included. We're ready with 150 craftsmen, the Northwest's best equipped shops and two 1,000-ton drydocks capable of handling vessels up to 200 feet. We're ABS-certified for propeller shaft repairs. We'll remove your faulty motors and engines and exchange them for dependable rebuilds. We carry a vast inventory of deck and engine supplies. We're proud of our record with fishermen such as Andy Arntsen. We're ready to work for you!

SEE US AT FISH EXPO BOOTH #6133

Circle number 33 on the Reader Inquiry Card

PEOPLE/PERFORMANCE

☐ Jimmy E. Saul has been appointed sales representative at **Laitram Machinery, Inc.**, New Orleans, La. Saul has been with Laitram 14 years, the last nine years as a service technician. His new duties include worldwide sales and work with Laitram's international agents. He succeeds Larry Boudreaux, who resigned recently to accept another sales position.

☐ Glenn Martin of **Pacific Pearl Seafoods** is the new operations manager for the company's Dutch Harbor and Captain's Bay plants in Alaska. Martin's previous position was production superintendent of the Dutch Harbor plant. As operations manager, Martin will be in charge of scheduling, maintenance, product movement, production and labor relations at the two king crab processing facilities.

☐ **Pacific Pearl Seafoods** has announced the creation of two new management positions. Michael D. Bollen will be director for procurement and distribution, and Joel Skerlong will assist Bollen in the new position of procurement manager. Bollen was previously distribution operations service manager at the company's Bellingham plant; Skerlong held the position of operations manager of Pacific Pearl's Seldovia plant.

☐ Robert Slate has been named manager of market development for **Foss Alaska Line** (FAL), a division of Dillingham Maritime. He will be responsible for developing new market opportunities and analyzing the feasibility of service expansion projects. Slate's most recent assignment was as manager of market development and research for Dillingham Maritime Ocean Division.

☐ Floyd Unger, former Northwest director of the National Marine Fisheries Service, is now employed as seafood industry loan expert by the new Seattle branch of **Barclays Bank International Ltd.** The Seattle branch, the 13th for the New York-based international bank, emphasizes Pacific Rim trade. Per-Odd Keul is vice president and general manager.

☐ Dr. George Giddings has joined **Radiation Technology, Inc.**, of Rockaway, N.J., as director of the company's Foods Division. Dr. Giddings, a food technologist, was formerly manager, marine resources, for the Chile Foundation, a philanthropic organization. His work will involve commercial applications to the food processing industry of radiation preservation techniques.

☐ A.A. Etchegary was elected chairman of the **Fisheries Council of Canada** at the annual meeting in Ottawa, May 11-13. Etchegary, president of Fishery Products Ltd. of St. John's, Nfld., will lead the Council through 1981-82, its 37th year of operation.

☐ Keith Ito has been named vice president and general manager of the Western Research Laboratory of the **National Food Processors Association (NFPA)** as part of a general reorganization following the retirement of Dr. Ira I. Somers as executive vice president of NFPA on June 30, 1981. Ito has been with NFPA since 1959. He had been assistant manager of the Western Research Laboratory. In other changes, Roger DeCamp was appointed director of NFPA's Northwest Research Laboratory in Seattle. Douglas Gordon was appointed director of the Fishery Affairs Division.

☐ The **California Seafood Institute** has elected Doug Harbison of San Pedro to its board of directors for a three-year term. CSI is a statewide trade association with individual and corporate members involved in all phases of California's fishing industry. Harbison is vice president of R.M. Sloan Company, San Pedro, a seafood brokerage firm.

See Us At FISH EXPO, Booth #6204

STONE

~ Service Since 1913 ~

W E S

W. E. STONE & CO., INC.
REFRIGERATION CONTRACTORS
MANUFACTURERS OF WESCOLD PRODUCTS

4220 22ND AVENUE WEST — SEATTLE, WA 98199
CABLE WESCOLD
(206) 284-5710

Circle number 75 on the Reader Inquiry Card

☐ **The Aleut Alaska Shipping Co.**, owned by the Aleut Corporation, and **American President Lines** have agreed to establish a jointly operated, regularly scheduled container service between Seattle and points in the Aleutian Chain. The operation is contingent upon enactment of federal legislation permitting subsidized U.S.-flag ocean carriers such as APL to provide unsubsidized domestic service, currently prohibited by law. Federal subsidies were enacted to enable U.S.-flag carriers to be competitive with foreign-flag carriers in international trade.

Under the new service, transit time between Seattle and Dutch Harbor will be only three and a half days, compared to the 15-to-21-day service available now. "The proposed service will contribute to the development of the vital Alaskan fishing and energy-related industries and to the general economic well-being of the local communities," according to Agafon Krukoff, president of the Aleut Corporation.

☐ **Pacific Northwest Expeditors**, Seattle-Tacoma International Airport, is a transportation management company formed to act as an intermediary between the perishables shipping community and the transportation industry. P.N.E. operates through an agency base servicing 165 cities in the U.S. and an international affiliate with more than 100 delivery points.

☐ **Foss Alaska Line** recently took delivery of 100 new, custom-built, 24-foot refrigerated containers. The new containers were built by the Comet Corporation of Spokane, Wash., and designed by Foss in association with Comet. Foss Alaska Line also has established a new surface-air freight service to selected Alaska cities. The service includes a combination of Foss motor-carrier service from Seattle to Juneau and air service to Alaska communities served by Alaska Airlines. The new combination of service, Foss says, allows year-round freight service to some Alaska communities that up to now received lower cost freight service on a seasonal basis only.

☐ **Sea Run Seafoods, Ltd.**, of Seattle has acquired the Sebastian Stuart Fishing Co. processing facilities across from Fishermen's Terminal. The move means increased production capabilities for the company, which provides inhouse and custom processing of salmon, king and tanner crab, and halibut. Larry Lundquist is plant and production manager.

☐ **VWH Company, Ltd.**, is the new name of the seafood brokerage formerly known as Vincent, Wade & Hines, Inc. The name change has been accompanied by a change of address to 601 Valley St., P.O. Box 9448, Seattle, WA 98109.

☐ **Sea Galley Stores Inc.**, a chain of seafood restaurants based in Mountlake Terrace, Wash., reported a 96 percent rise in net profit to $464,000 for the first quarter ended March 31, compared to the same period last year. Sales for the quarter were up 74 percent to $7.7 million.

The stock of Sea Galley Stores Inc. showed the greatest growth among common stocks of Washington state companies during the first six months of 1981, according to a list prepared by the brokerage firm Piper Jaffray Northwest. The stock nearly tripled during that time period.

In April Sea Galley Stores Inc. purchased the 31-unit Family Fish House chain, located in the Southeast. Since that takeover, nine of the newly acquired restaurants have been sold because they were "not ideally suited for conversion to the Sea Galley concept," according to Steven B. Dowen, chairman and president of Sea Galley Stores.

☐ **International Pacific Seafoods, Inc.**, California seafood broker, has announced a move from Los Angeles to a new office facility at 11264 Rush St., S. El Monte, CA 91733. The new building features a fully equipped test kitchen and a large meeting room to accommodate the company's seafood seminars.

☐ **Western Marine Electronics** was a top gainer during the first six months of 1981 among common stocks of Washington state companies. A list prepared by Piper Jaffray Northwest shows the company's stock increased 45 percent between Dec. 31 and June 30.

☐ **Skipper's, Inc.**, of Bellevue, Wash., reports record sales in 1980. The operator-franchisor of 113 Skipper's Seafood 'N Chowder House restaurants on the West Coast announced sales totaling $2,325,000, a 29 percent increase over the previous year.

Skipper's began its franchise program in 1978 and today has operations in Oregon, Idaho, North Dakota, Alaska, Washington, Utah, California and British Columbia.

Meet the Northstar 7000, the first computerized Loran-C navigator that speaks your language. Over 200 messages provide navigating data and cues. Completely automatic, the 7000 is comprised of components with 'full-control' weatherproof remotes, making Loran-C navigation available anywhere on board. The 7000 is the next generation of the renowned Northstar 6000, recognized as the most powerful and accurate for Loran-C reception. For details on all of the 7000's capabilities call or write:

The Micro Pros™ make the Loran-C system work.

DIGITAL MARINE ELECTRONICS CORPORATION
30 Sudbury Rd., Acton, Ma 01720 (617) 897-6600

"See Us At FISH EXPO Booths #437, 439"

Circle number 26 on the Reader Inquiry Card

MIDWEST RETAIL:

AT BYERLY'S, SEAFOOD PAYS

Dave Conner has always been able to sell fish. He's so good that a previous supermarket employer remarked, "Dave, you're selling too much fish here; we've got meat to sell."

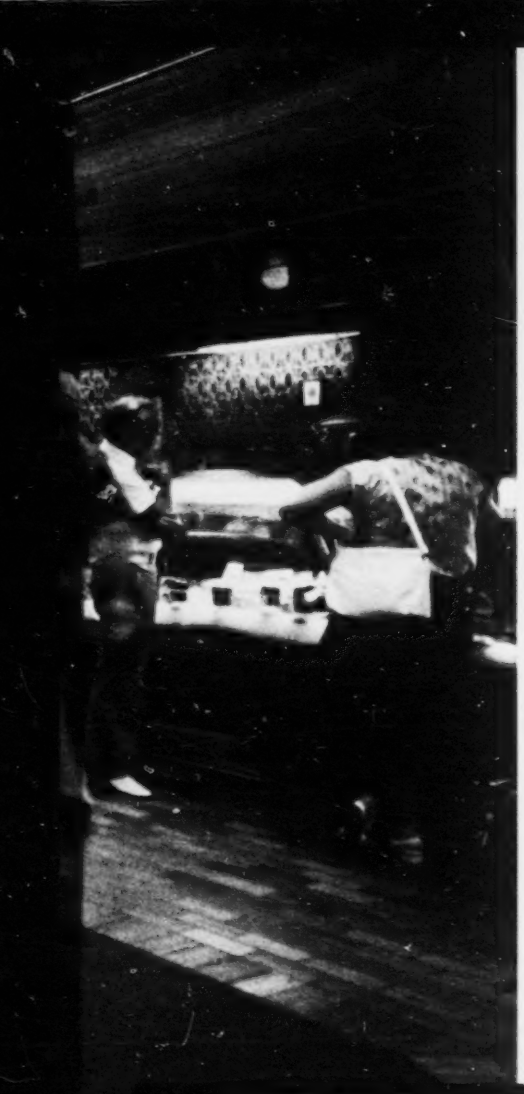
For the past year and a half Conner has worked for Byerly's, a five-store Minnesota supermarket chain that stresses seafood. Conner has found his niche, and at Byerly's, business is booming.

Seafood sales are "unbelievable, absolutely unbelievable," says Conner who is seafood coordinator of Byerly's St. Louis Park supermarket just west of Minneapolis.

The average supermarket in the Twin Cities (and nationally) limps along with seafood sales at a paltry five percent of total sales of meat, poultry and fish. Byerly's St. Louis Park seafood department has boosted its weekly seafood sales to a *low* of 22 percent of total meat sales. In Byerly's four other supermarkets in St. Cloud, St. Paul, Edina and Golden Valley, seafood sales are up 50 percent over a year ago.

"Our competition is looking at every move we make," says Robert Kinsman, vice president of operations. "They are saying, 'Geez, if Byerly's is successful, then we have got to put it [large seafood departments] in.' But they're not successful because they don't give fish the tender loving care that we do."

Drop in on Byerly's St. Louis Park store and you may find the fish department selling fresh fish to a regular customer from Philadelphia who combines business with seafood purchases to take home, packed for the trip. Or you may see some of Byerly's regular customers who drive from Fargo, N.D., southern Minnesota and Iowa to buy quantities of the 310 varieties of high-quality fresh



Spacious, immaculate areas and a variety of well-displayed, frozen, fresh and live seafood is the Byerly's approach to merchandising.

BY BRUCE J. COLE

PHOTOGRAPHS BY JOHN E. CROFT

Byerly's sells fish by pushing the variety and high quality of seafood. The St. Louis Park store carries smoked herring, whitefish, salmon, sablefish, trout, crab and eel. Bowls set on ice attractively present escargot, king and snow crab legs, shrimp, caviar, clams, oysters and scallops, only part of the fare offered in the fresh fish case.

and frozen seafood carried by Byerly's during the course of a year.

So successful has been the St. Louis Park store that the new Byerly's market under construction at Minnetonka will feature a similar, large fish department.

The Byerly's approach is a deliberate attempt to maintain the level of total meat, poultry and seafood sales in the face of rising beef prices and declining beef consumption. Another reason for Byerly's interest in seafood is its profitability. Byerly's realizes a markup of 30 to 35 percent on its seafood products, compared to a 15 percent markup on most beef items.

"The future has got to show some big increases in sales of seafood," says Byerly's Kinsman. "Our seafood effort is done with the thought that red meat sales are doing a turnaround for the worse. We're trying to stop the erosion of the distribution of our meat department. We're working very hard to keep up the total meat department sales with seafood."

Byerly's seafood success comes from paying attention to details most supermarkets ignore, details like education of department personnel, consumer education, product quality and merchandising. Of these, Conner says, the most important is the education of seafood personnel.

"Our salesmen are the key factor," Conner says. "It is just like selling a used car. If someone doesn't sell 'em, you're going to have to eat 'em."

Byerly's employees are taught recipes and preparation times. They are involved in the Byerly's test kitchen in tasting new species (everything is taste tested before it is purchased and marketed) and in developing recipes. Seminars are held to teach meat market personnel who help out in the seafood department.

Part of the educational approach to seafood department personnel, Conner says, is, in effect, to "sell" them on new seafood. "If they [department personnel] like something, they are going to want to sell it. If they don't like it, nobody is going to like it."

The Byerly's approach to the consumer is to sell the infinite variety of seafood. "We try to create a trust," Conner says. "We have people who come in here all the time and ask us what they are going to have for dinner. We sell them some fish they have never tried and tell them how to prepare it. They take it home and don't think twice about it. The next day they come back, tell us it was delicious and they want to try something else."

With the education of seafood department personnel, consumer education, the second most important chapter in Conner's book of seafood sales, comes naturally. Price, says Conner, is not that important. "If we sell them something good, they'll come back."

The seafood department's chest and upright freezers contain, among other brands, Wakefield crab; Nickerson cod, perch, turbot, flounder and haddock; Booth Fisheries perch; Avalon Bay stuffed sole, snapper and shrimp; Pier 12 salmon and bottomfish fillets and steaks; as well as Byerly's products.

"We have people who come in here all the time and ask us what they are going to have for dinner."

The quality of Byerly's seafood and the way it is merchandised are two other critical factors in Conner's book. When a consumer walks into the seafood department at St. Louis Park, he sees an impressive array of fresh, frozen and live fish. A 30-foot cooler displays on ice top-quality fresh fish flown in daily from both coasts.

On a typical day last summer, Byerly's fresh case contained fresh Dungeness crab ($2.89/lb.), king salmon ($5.99/lb.), fresh fillets of ling cod ($2.69/lb.), true cod ($2.69/lb.), red rock cod ($2.29/lb.), Dover sole ($3.99/lb.), Petrale sole ($5.99/lb.), and English sole ($3.99/lb.). From the East Coast the case contained fresh haddock ($3.98/lb.), cod ($4.49/lb.), gray sole ($5.99/lb.), blue fish ($3.99/lb.), and scallops ($8.99/lb.).

Byerly's carries a full line of frozen brands in two freezers, one five-tier upright and a large chest unit — Wakefield crab; Nickerson cod, perch, turbot, flounder and haddock; Booth Fisheries perch; Avalon Bay stuffed sole and snapper, and shrimp; as well as the Commodore and Hyliner brands.

But the fastest moving frozen brand now, Conner says, is Pier 12, a vacuum pack of steaks and fillets completed with a roll stock machine. The end result is a classy looking package that shows off the product from both sides.

"It outsells any of the frozen fish,

alaska fresh seafoods, inc.

TELEX: 32-1295
Tele: 206-285-2412

Frozen King and Snow Crab

Fishermen's Terminal Bldg., C-3, Seattle, WA 98119

Circle number 4 on the Reader Inquiry Card

Sea-Alaska Products Incorporated
a ConAgra company

PRODUCERS AND DISTRIBUTORS OF FROZEN
ALASKAN KING CRAB, SNOW CRAB
AND SALMON
UNDER THE "ALASKA SEAS" AND
THE "STORMY SEAS" BRANDS

Sea Alaska Products, Inc.

Suite 300 150 Nickerson St. Seattle, Washington 98109
(206) 284-2051 Telex: 32-0240 Sea-Alaska Sea

Plant Location: Dutch Harbor

Circle number 68 on the Reader Inquiry Card

I would say, 10 to 1," Conner says. "There is no frost buildup, no freezer burn and no shrinkage. It is a high-quality product."

From the East Coast, fresh fish is flown into Minneapolis from Boston's Sea Frost Fish Co. Haddock, cod and flounder unloaded at the Boston pier one day are cut, packaged, shipped and in Byerly's display case the next.

From the West Coast, Horizon Fish Co. in Corte Madera, California, air freights to Byerly's red and green rock cod; albacore; Dover, English and Petrale sole; ling and true cod; shrimp meat; and scallops.

A consistent supply of good, fresh, West Coast fish has been hard to find. Despite efforts to locate West Coast sources of fresh fish (see related story, pg. 33), Conner says he was unable to find a reliable source until mid-1981.

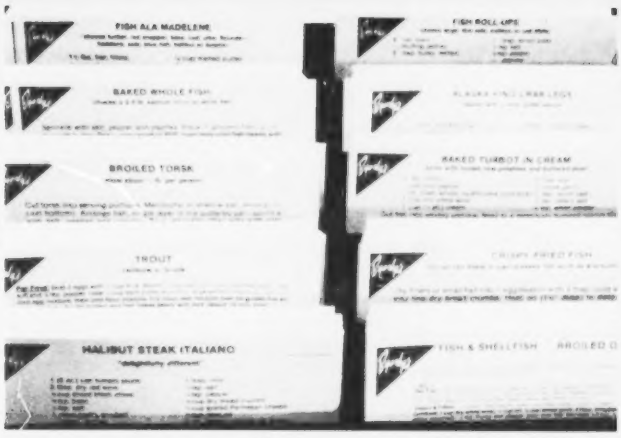
"With the increase in fish sales that's going to take place in this town over the next five years, it is just a matter of whether the East Coast is going to have the business or the West Coast. Right now it looks like the East Coast."

Conner is not bashful when it comes to predicting how fish will fare competitively against beef.

"We feel in the next five years that there is going to be a turnaround and people are going to be eating 80 percent fish and 20 percent beef — meat is on the way out. The future cost of raising cattle is going to be prohibitive."

"That is why Mr. Byerly is gearing up for the future. He knows that sooner or later, people will turn to fish."

The Byerly's success, one might speculate, may be due to the concentration of fish-loving Scandinavians in the Twin Cities area. Not so, Conner says. For its seafood customers, Byerly's is also drawing heavily from the Asian, Italian and Jewish communities.



Recipes support Byerly's consumer education efforts.

Nor can one find the answer to Byerly's success in a heavy advertising effort. The Byerly's philosophy is to do no newspaper advertising, to let word-of-mouth be its advertising (one of the few exceptions was a recent two-page advertisement in the *Minneapolis Tribune* that listed no products, but advertised the fresh fish department).

From the St. Louis Park store, Byerly's is currently moving 4,000 lbs. of seafood weekly. More than 80 percent of sales are for fresh product. Through an in-store special last year Byerly's moved 30,000 lbs. of fresh Dungeness crab in its five stores in July. A follow-up program in September and October resulted in further sales of 1,200 cases of frozen Dungeness. Current weekly seafood sales in the St. Louis Park store range between 22 percent and 38 percent of total fish and meat sales. Of total store sales, the fish and meat departments comprise 21 percent.

Raised in northeastern North Dakota, Conner became interested in preparing seafood "any way you can imagine" after a childhood seafood diet limited to the occasional lutefisk dinner.

His interest in seafood and his knack for selling it became apparent when he was promoted to manager of the meat department in another grocery chain and promptly boosted seafood sales by 100 percent.

"My employer used to come down and tell me, 'You're selling too much fish, we've got meat here to sell.'"

Is the success of the Byerly's St. Louis Park store an aberration in a nation of ho-hum retail seafood departments?

"I don't think so," said Kinsman. "I don't think it is unreasonable to expect those results, but you've got to be able to do it in the fashion that we have done it in St. Louis Park."

Transit temperature management problems?

Are you absorbing losses on arrival due to harmful temperature fluctuations—*when the fault is not yours?* The placement of a Ryan Recorder in each shipment can eliminate this problem by providing you with a known transit temperature chart history to pinpoint refrigeration management responsibility.

ryan instruments, inc. A Peabody Company
P.O. Box 599, Kirkland, WA 98033
Phone: 206-827-9572 • Cable: RYANSEA • TWX: 910-449-2870

Circle number 65 on the Reader Inquiry Card

Does Anyone Out West Have Fish For Sale?

"There is nobody out there on the West Coast that's interested in selling fish in this town."

That was the opinion of Dave Conner, seafood coordinator for Byerly's St. Louis Park supermarket until this year.

Last year, he called 15 West Coast packers in an attempt to locate sources of fresh fish. Half of them had no product, a third of them had product but no way to ship it. The others had product and were set to ship. They promised Conner, he says, to follow up.

"I heard from only one of them a year later. I asked this guy, 'You call me a year after I called you. So what happened in between?'"

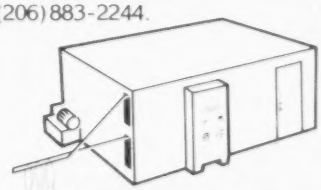
The East Coast has put together a marketing effort to move fish to the Midwest, he says. In the seven years Conner has been in the business, no one came around trying to move West Coast product until Jeanne McKnight of the West Coast Fisheries Development Foundation visited Conner this year.

"Jeanne McKnight has done more for the West Coast industry in this town in the last three months than I have seen anyone do in years. She went around and pitched the supermarket chains on West Coast product. She stirred up interest."

From that effort several chains ran a promotion on West Coast fish. And McKnight put Conner in touch with the Horizon Fish Co., which now supplies up to 1,500 lbs. of fresh fish weekly.

"As people get to know that West Coast fish is available they will make a special trip here just to buy it. There are some excellent, excellent fish on the West Coast and the potential for marketing it is great."

One of these fish is frozen. It's hard to tell from the fresh fish because it was frozen in a FISKoFREEZE, the new continuous in-line freezer from Frigoscandia for whole salmon and bottom fish. FISKoFREEZE's exclusive hanging system provides a natural shape, eliminates flat sides. Labor savings, good looking product plus fast freezing time, all in a compact arrangement for floating or shore-based operations. Write or call Frigoscandia today for more information. Frigoscandia Contracting, Inc., P.O. Box 3984, Bellevue, WA 98009; (206)883-2244.



FISKoFREEZE
by
AGA FRIGOSCANDIA
The World's Cold Standard

Circle number 35 on the Reader Inquiry Card

SHELF LIFE

EXTRA DAYS FOR QUALITY SEAFOOD

By Nancy Hames Hasselback

Drawings by Jim Sollers

Francis Bacon buried a chicken in a snow bank and discovered that refrigeration retards spoilage. Louis Pasteur convinced the world that heat destroys bacteria, paving the way for the canning industry.

Now, in an effort to extend seafood's shelf life beyond present limits and to bring a consistent, high quality product to the consumer's table, scientists and processors are gassing fish with carbon dioxide or ozone, zapping it with ionizing radiation, and dipping it in chemical solutions. But with each new discovery, the importance of temperature control reaffirms itself as irreplaceable. Once abused, no means can resurrect a fish to its original state.

Increasing consumer demand for fresh, high quality seafood has intensified the search for methods of extending shelf life. A new awareness of health and nutrition nationwide has broadened horizons for seafood distributors. People of the plains and mountains are clamoring for their share of fresh fish. Reaching these consumers with a quality, but affordable product has been a challenge.

Worldwide demand for protein has led to the harvest of untraditional species, such as whiting and pollock. Unlike cod and salmon, many underutilized species spoil faster, and that has triggered shelf life research to bring these species up to par.

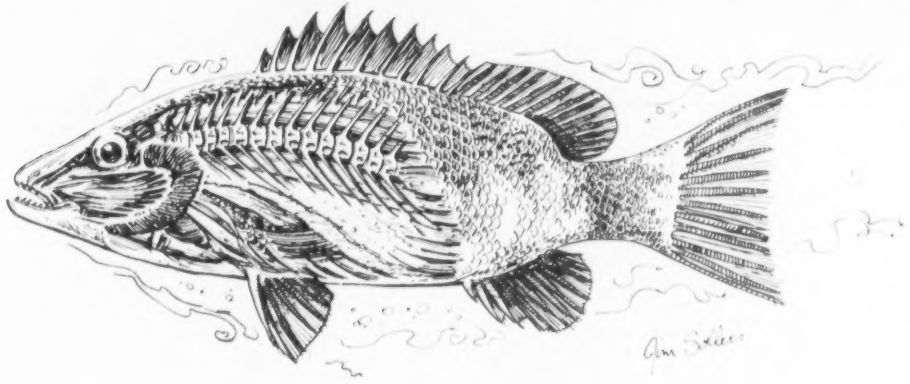
Economically, processors strive to distribute as much of their product in its fresh state as possible. A 20 cents per lb. premium for fresh over frozen may be a crucial difference in today's unforgiving marketplace. If application of a fish dip adds three days to the shelf life and 3 cents per lb. to the product's cost, a processor will most likely choose to dip.

A discussion of means of extending shelf life must begin with an understanding of why fish spoils. Following will be analyses of the technology behind and applications for techniques processors may currently use, or which may be available in the near future, such as: temperature control, prepackaging, irradiation, carbon dioxide atmospheres, ozone, additives, blanching and refrigerated sea water systems.

O3
Sollert

SPOILAGE PATTERNS:

Unlocking Nature's Secrets



To survive in the cold, salty, feast-or-famine conditions of the sea, a fish protects itself by maintaining systems to control enzymes and prevent bacterial attack. These systems die with the fish, but en-

zymatic and bacterial invasion continue, numbering the days a fish may be consumed.

Enzymes, secreted through glands in the stomach, act as catalysts to speed up digestion, and are especially useful in those 'get it while you can' feeding frenzies. After death, enzymes continue to act as catalysts, accelerating chemical reactions among amino acids, the nitrogenous compounds which form the protein structure in fish. Once a fish dies, nitrogenous compounds convert to compounds with putrid smells, such as ammonia. The process is known as autolysis to scientists, belly burn to processors. Conversion is aided initially by tissue enzymes and finally by enzymes produced by multiplying bacteria.

Nitrogenous compounds enable a fish while living to purge salt concentrations from its blood stream, equalizing the osmotic pressure of the salty sea. Concentrations of these compounds differ according to species. When low-fat whitefish spoils, trimethylamine oxide (TMAO) reduces to trimethylamine (TMA) and proteins reduce to ammonia. Fatty fish such as tuna and mackerel have high concentrations of histidine which converts to histamine, an indicator of spoilage. Sharks and other cartilaginous species become putrid from the production of ammonia from urea. Certain amino acids in fish contain sulfur which decays and produces hydrogen sulfide.

In species such as Pacific cod, enzyme action can be significantly impeded by gutting immediately after harvest. At the same time, a prime source of bacteria is eliminated. Bacterial action takes over the spoilage process after tissue enzymes have taken their toll during the first few days of storage.

Bacteria are microorganisms which survive on the gills, surface slime, and within the intestines of live fish. Flesh is sterile until after death when bacteria multiply rapidly. These bacteria spread into the flesh near the skin and belly walls. Depending on conditions of the marine environment (temperature, pollution, substrate matter), the initial number of bacteria varies from a few hundred to several millions per square inch of surface flesh. Bacteria reproduce logarithmically. Uncontrolled, 1000 bacteria potentially generate 2.5 million in four hours.

Certain species of bacteria contribute to breaking down the components of fish into odor producing compounds. Others, also present in seafood, are pathogenic (disease producing) to humans. *Salmonella*, found in shellfish, causes an infection when digested which can result in food poisoning. *Clostridium botulinum*, present in marine and fresh water environments, produces a toxin potentially lethal to humans. *Clostridium botulinum* type E, with a breaking point for growth of 38 degrees F, is the type most commonly found in seafoods. Types A and B, more prevalent in poultry, need considerably higher temperatures to develop. It is necessary to remain aware of these organisms when experimenting with a means of inhibiting bacterial growth. Wiping out one strain of bacteria may produce excellent growth conditions for another.

While amino acids undergo chemical reactions resulting from enzymes and bacteria, lipids undergo oxidation. Lipids are unsaturated fats which act as an antifreeze for a fish living in cold waters. During refrigerated storage after harvest, lipids combine with oxygen and form peroxides. Peroxides break down to aldehydes and ketones, responsible for the rancid odor and flavor accompanying oxidation. Flesh turns brown or yellow, visibly limiting shelf life. Oxidation is the principal destroyer to the longevity of frozen seafood and is especially detrimental to fish high

in unsaturated fats.

Unfortunately, all seafood does not follow a prescribed spoilage pattern. Spoilage rates vary tremendously. Even within each genus, species vary. Widow rockfish, for example, was found to be unacceptable after four months of storage at zero degrees F, whereas the frozen shelf life of Pacific Ocean perch, also within the genus *Sebastes*, approaches one year. Consequently, species react differently to means of extending shelf life. Results of a testing procedure for one species may not be applied to another without further testing.

Some species vary within themselves. Whiting possesses a fat streak which oxidizes more rapidly than the white flesh. To ensure keeping quality and a uniform product, scientists, under the guidance of Dr. John Dassow at Seattle's National Marine Fisheries Service lab, established a means of deep skinning for whiting. The payoff in extra time in the freezer compensated for the 20 percent loss of product.

Although spoilage patterns differ among fish species, historically enzymes and bacteria have taken the blame for short shelf lives as described above. But results of a recent experiment conducted by Dr. George Strasdine at B.C. Research may cause an upheaval among basic theories of fish spoilage. Strasdine's hypothesis discounted bacterial action as a factor in spoilage. These results proved his theory: A 40-member taste panel was given three samples of cooked Pacific cod. One sample contained no bacteria, having been processed and stored under aseptic conditions. The other sample was processed under normal conditions and contained high amounts of bacteria after ten days. Panel members were presented with two aseptic fillets and one bacteria laden fillet, or vice versa. The samples proved indistinguishable. The test panel could not pick the odd sample.

To obtain samples for the experiment Strasdine and his associates intercepted Pacific cod upon delivery to a processing plant. A fillet was taken from one side of 70 randomly selected fish. Each fillet was labeled and sent back to the laboratory to be processed aseptically. The procedure resembled a surgical operation and was successful in obtaining fillets containing no bacteria. The labeled fish, minus one fillet, continued down the processing line, picking up normal amounts of bacteria which generated an average of one million bacteria per gram after ten days. Labeling the fillets eliminated any other variables besides bacterial counts. The laboratory processed fillets, originally sterile, picked up a small number of bacteria, but after 10 days, counts were well below those of the contaminated fillets coming off the processing line after day one. Both fillets deteriorated to the same degree.

"As a microbiologist, I am dismayed at our results," reports Strasdine. "Bacteria should spoil food." But his findings are confirmed by similar experiments undertaken in Denmark with round, iced cod. Strasdine intends to experiment with different species at higher temperatures, but believes he will see the same results, "except everything will happen faster."

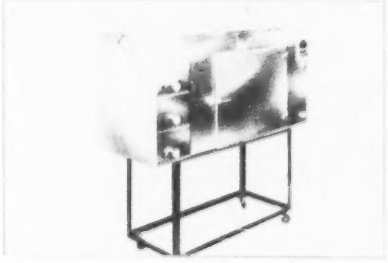
The same experiment challenges the belief that trimethylamine (TMA) formation is attributed to bacterial decomposition. TMA values in the aseptic fillets were very high, although not as high as the contaminated fillets, yet the bacteria were missing.

The ramifications of Strasdine's research will result in greater importance given to the biochemical processes which are activated by enzymes within the fish. Inhibiting those processes, rather than killing bacteria, should be effective in prolonging shelf life. Bacteria counts remain important as indicators of plant cleanliness and good housekeeping standards. High plate counts are significant from a public health standpoint because they would indicate the potential presence of pathogenic organisms.

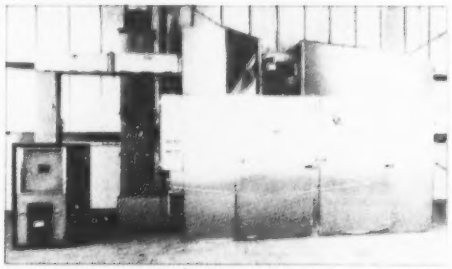
AFOS

The World's Most Popular Fish Smoking Kiln

Now operating in More than 70 Countries



Mini Kiln with capacity up to 100 lb hot or cold smoking



All stainless steel, fully automatic No 60 with capacity up to 1,000 lb

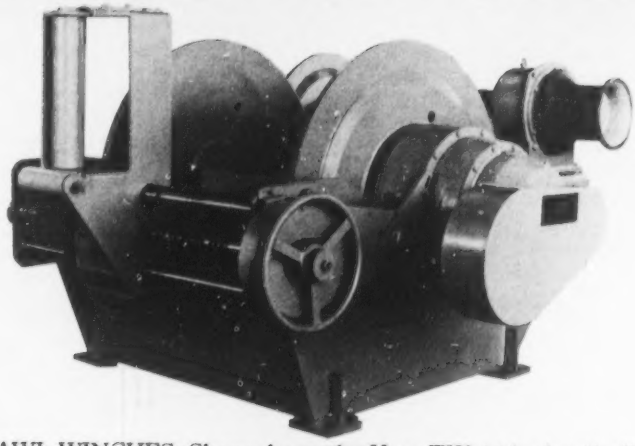
- Six models, one for every fish smoking need, capacities up to 2 tons per single unit
- Prices begin at $3,000
- Rapid drying or curing time
- Delivered ready to install; wiring and ventilation is all that's required
- Compact and easy to operate
- Produces a very high quality smoked fish
- Defrosting equipment also available

Afos Limited, Manor Estate Anlaby, Hull, England HU10 6RL
Telephone Hull (0482) 52152
Telex 527231 (ans back Afos) Cable Apex Hull

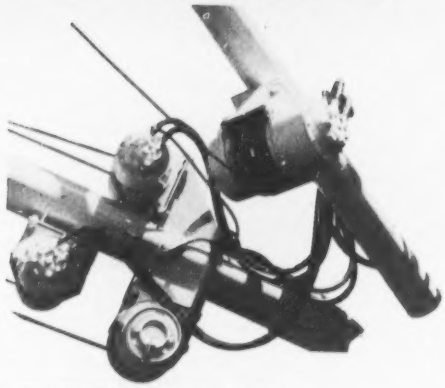
Agent for U S and Canadian West Coast Eurotech Inc
5416 20th NW, Seattle, WA 98107
Telephone (206) 782-3051 Telex: 32-0190

Circle number 1 on the Reader Inquiry Card

FROM CATCHING

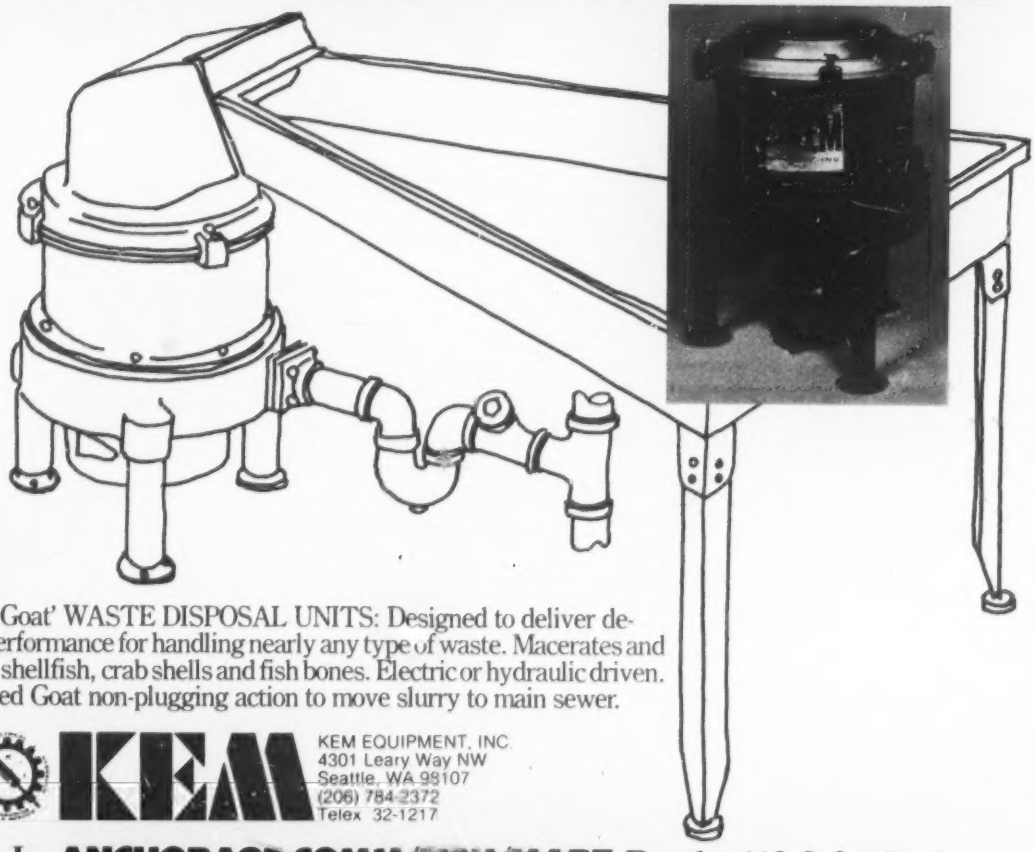


TRAWL WINCHES: Shown here, the Kem TW-44 hydraulically driven trawl winch. Uses three planetary gear sets. Complete control in forward and reverse operation. Heavy-duty friction bearings throughout. Built to meet the demands of trawlers the world over.



WINCHES: Complete line of hydraulic winches with full range of options. Line pulls from 4,000 to 44,000. Features automatic 'fail-safe' braking. Infinte options on drum size and line speeds.

TO DISPOSING



KEM 'Red Goat' WASTE DISPOSAL UNITS: Designed to deliver dependable performance for handling nearly any type of waste. Macerates and disposes of shellfish, crab shells and fish bones. Electric or hydraulic driven. Features Red Goat non-plugging action to move slurry to main sewer.

KEM

KEM EQUIPMENT, INC.
4301 Leary Way NW
Seattle, WA 98107
(206) 784-2372
Telex 32-1217

See You In: ANCHORAGE COMM/FISH/MART, Booths 112-3 & 131-2
SEATTLE FISH EXPO, Booths 541-5 & 642-6.

Circle number 47 on the Reader Inquiry Card

TEMPERATURE CONTROL:

Age-Old Ice Still Produces Top Quality

Temperature is the single most important factor controlling the speed at which fish spoils. Each new preservation technology carries with it the warning: use with proper refrigeration. A product cooled consis-tently and thoroughly with ice, exempt from any other preservation technique, should yield an acceptable shelf life of 15 days from the day it was caught.

"The fundamental rules have not changed," says Dr. John Dassow, who has witnessed the births of many technologies as deputy director of the Northwest and Alaska Fisheries Center. When seafood reaches its processing location it must be as fresh as possible, handled very fast, kept as cool as possible, packaged well against oxidation and dehydration, and then, if frozen, it must be frozen uniformly and stored under as low as possible temperatures.

Chilling must begin on board as soon as possible. Dr. George Strasdine's work at B.C. Research indicates an additional 24 hours of shelf life can be gained if fish are cooled immediately. Fortunately, ice is an excellent medium for absorbing heat from fish. Its effectiveness depends on the amount of ice used per pound of fish, the thickness of fish layers, and ambient temperatures. A rough rule of thumb is to allow 1 lb. of ice for each 2 lbs. of fish. Rack storage on board rather than piling fish in bins is recommended by Richard Nelson, National Marine Fisheries Service scientist. Not only will fish suffer less bruising but ice can be distributed more uniformly.

Once fish are in the hands of the processor, he may control shelf life by holding the product as close to freezing as possible without freezing. Because bacterial growth rates and biochemical reactions both double with each 15 degree F rise in temperature, a fish held at 45 degrees F will spoil twice as fast as one held at 30 degrees F. Ideally fish destined for the fresh market should be held between 30 and 32 degrees F. The industry norm is closer to 35 degrees F. The amount of energy consumed to con.e down a few degrees may be minor compared to potential profits from a hardier product.

An iced fish coming on a fillet line at 35 degrees F will come off at 45 to 50 degrees F, assuming a 15- to 20-minute processing period. Unless workers are accustomed to refrigerated working conditions, temperature

★★★

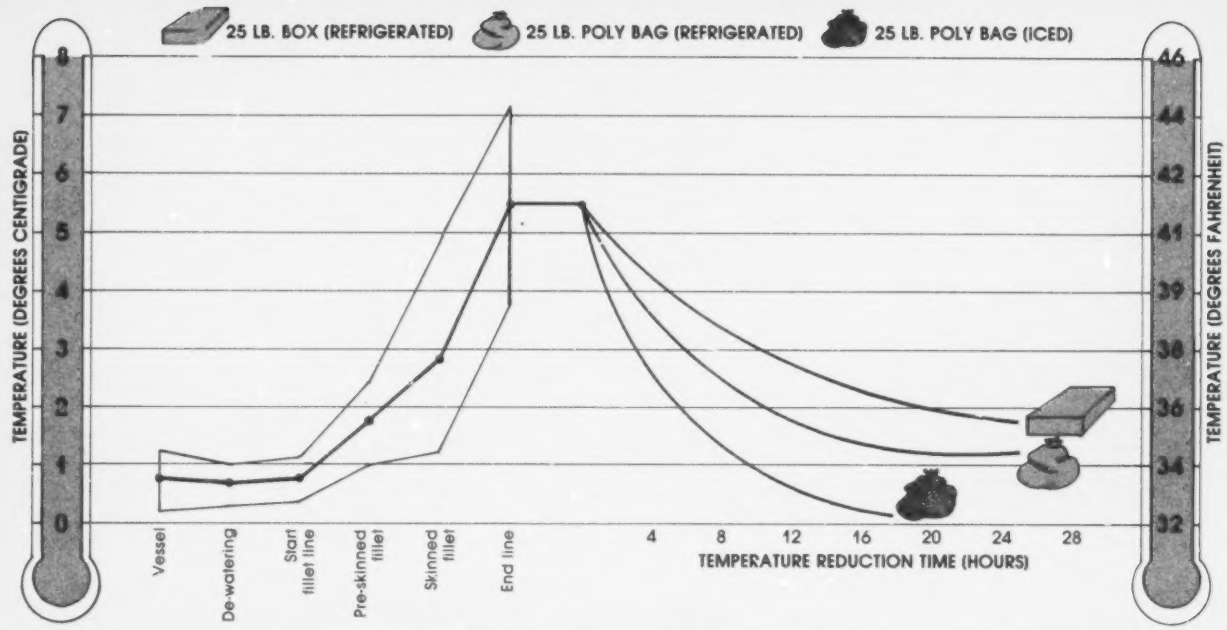


Figure 1. Despite rapid movement through stations of a processing plant and minimum exposure time to ambient temperatures (60 degrees F), product temperature slowly rises, affecting ultimate shelf life. Fresh cod fillets are monitored for temperature ranges at each station of a plant. Coming off the line at 41.5 degrees F, the fillets are packaged in boxes and bags, and held under refrigeration or on ice. Temperature reduction times for the product under three different holding conditions are measured. An iced poly bag of fillets is found to be most acceptable for quick temperature reduction.

increase at this stage seems unavoidable. But the rate at which processed fillets are re-cooled can be controlled. A 25-lb. bag of fillets cools from 50 degrees F to 35 degrees F in 12 hours if held at 32 to 35 degrees F. According to studies by B.C. Research, these fillets will subsequently spoil at a rate 1.5 times faster than they would, had their temperature been reduced immediately to 35 degrees F. Strasdine suggests a cold blast of carbon dioxide at the end of the line for immediate cooling.

To bag or to box becomes a factor in the cooling equation. Because the container affects temperature reduction, the decision may be crucial. Waxed cartons with polyethylene liners may be effective insulators against heat, but they are equally effective in preventing rapid chilling. For example, fillets packed in a 25-lb. box require 20 hours to reach 3 degrees C (35 degrees F) whereas fillets in a 25-lb. bag require 12 hours. (See graph, figure 1.) Further experiments by Strasdine identified temperature reduction times within each box according to its location as stacked on a pallet. Twenty-four boxes containing 3 lbs. of fillets each were evaluated. Boxes on the bottom sides of the stack cooled twice as fast as those in the middle and on top (see figure 2).

If fillets are bagged and held on ice, bag volume is a factor to consider. A 6.25-lb. bag of fillets cools in one quarter the time a 25-lb. bag requires (see figure 3). Overall results show that for a wholesale package of fillets, most rapid cooling, with subsequent maximum shelf life, is gained by packing small volume bags on plenty of ice.

SHAFER-HAGGART LTD.

FOUR STAR Brand
DISTRIBUTORS — EXPORTERS

SALMON FROZEN
HALIBUT FRESH
SHRIMP CANNED
CRAB SMOKED

Vancouver Office:
750 W. Pender St., Suite 600
Vancouver, B.C.
Canada, V6C 2V5
Telephone No.: 604-669-5512
Telex No.: 0453299

Seattle Office:
4660 E. Marginal South
Seattle, Washington 98134
U.S.A.
Telephone No.: 206-767-5331

Circle number 72 on the Reader Inquiry Card

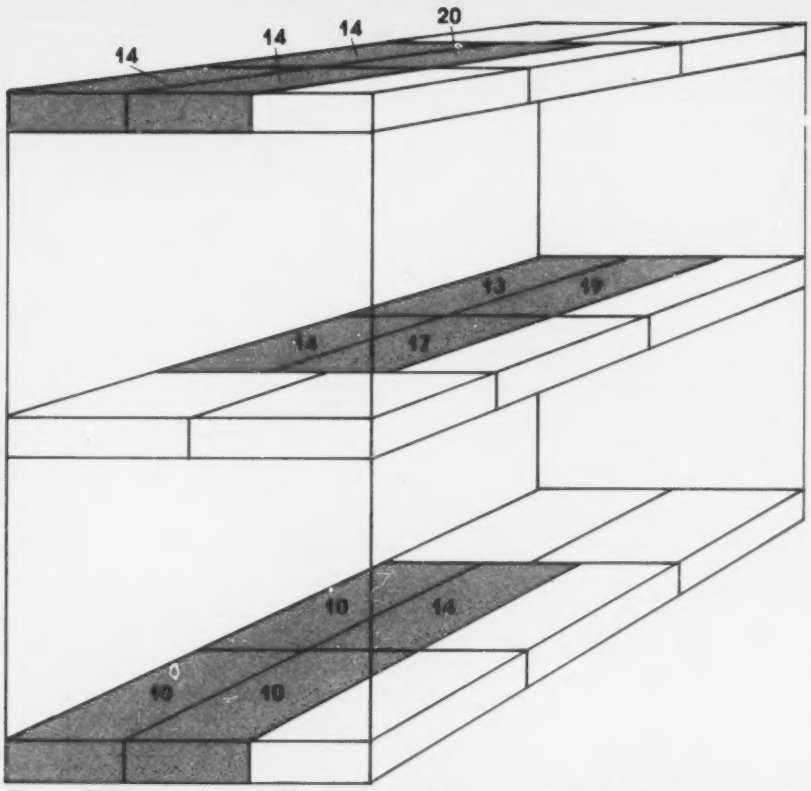


Figure 2. The time required to reduce fillet temperatures varies according to where each 3-lb. box is stacked on a pallet. The numbers on each box designate the number of hours each box required to cool from 50 degrees F to 39 degrees F. Boxes on the bottom of the stack cool faster than those on top.

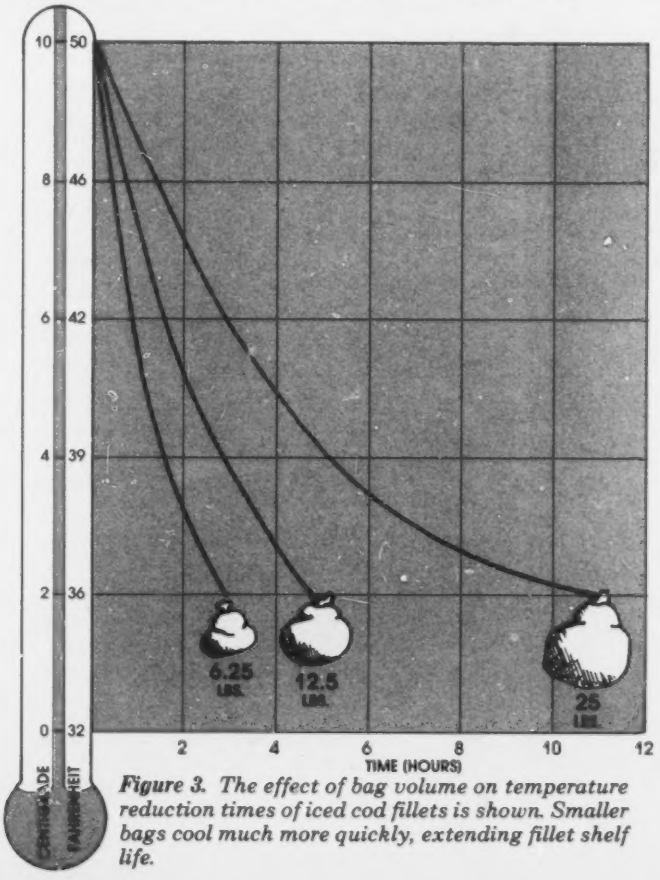


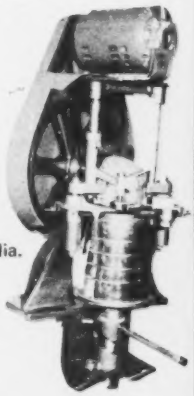
Figure 3. The effect of bag volume on temperature reduction times of iced cod fillets is shown. Smaller bags cool much more quickly, extending fillet shelf life.

CAN CLOSING MACHINES

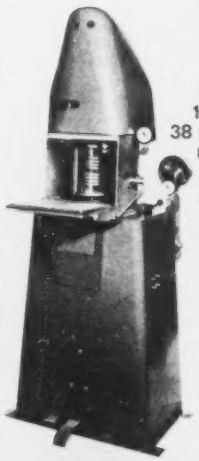
For Small & Large Canneries, Pilot Food Plants, Experimental & College Food Laboratories

CLOSING MACHINES for hermatically packaging in round tin, aluminum, composite or fibre body cans with light weight metal top at speeds up to 8CPM (Cans Per Minute).

MODEL 23
1½ to 4¼" dia.
38 to 108 m.m. dia.
Up to 8 CPM
Atmospheric
Closer



MODEL 10
5⅛ to 6³/₁₆" dia.
130 to 158 m.m. dia.
Up to 5 CPM
Atmospheric
Closer



MODEL UV
1½ to 6³/₁₆" dia.
38 to 158 m.m. dia.
Up to 4 CPM
Vacuum,
Atmospheric
or Gas
Closer

AVAILABLE FROM STOCK

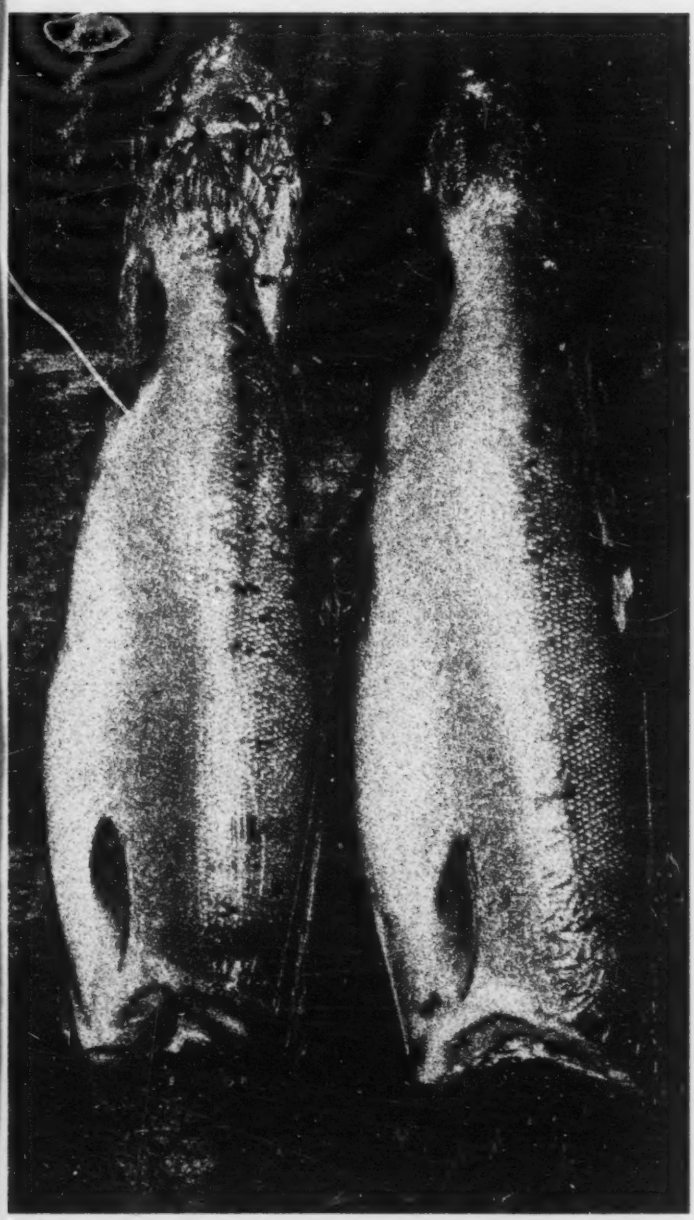
SINCE DIXIE 1914

WRITE FOR CATALOG and mention items of special interest.

DIXIE CANNER EQUIPMENT CO.
P.O. Box 1348, Athens, Ga. 30601 USA
Phone: 404-549-1914

Circle number 28 on the Reader Inquiry Card

NOW SALMON ARE RUNNING YEAR-ROUND IN CRYOVAC® VACUUM PACKAGING.



The past two seasons have been marketing milestones for the salmon industry, as many far-sighted producers switched to Cryovac vacuum packaging materials and equipment and began to reap benefits that promise to revolutionize the marketing of salmon throughout the world.

This new system may have signaled the beginning of the end of the ice age. No more time-consuming and expensive glazing. No more dehydration, freezer burn, or losses due to chipping. Vacuum packaging in the tough, impermeable Barrier Bag® from Cryovac fully protects the flavor, texture and color of the fish, and provides longer distribution life.

Vacuum packaging for salmon is another example of the total-systems technology developed by Cryovac that has provided improved distribution for many perishable food products.

And it won't stop with salmon. **We have better packaging ideas for both retail and food service applications.** All it takes to get an idea started is a call to a Cryovac representative. He thrives on marketing/packaging challenges.

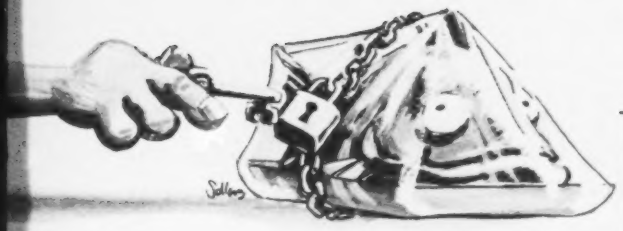
See us at FISH EXPO
booths -6104, 6106, 6108

CRYOVAC

To explore a new idea for your product line, call:
Charlie Slagle or Bob Blickenstaff
Cryovac Division
W.R. Grace & Co.
P.O. Box 6023
Hayward, California 94540
(415) 782-1423

Circle number 23 on the Reader Inquiry Card

PREPACKAGING:



Processors Secure a Lock on Quality

Packaging fillets in a retail container at the end of the processing line provides an attractive, easily handled, and protected product that lasts longer on the shelf. "You're going to see extra days because the processor is controlling the seafood a

little further down the line," believes Frank Steuart, president of Steuart Seafoods, Inc. "The meat manager doesn't have to take a fillet and lay it on the table in 50-, 60-, or 70-degree temperatures and pack it himself. It goes right from a controlled environment to a controlled environment." A processor may choose between several packaging systems, ranging from a film covered foam tray to a vacuum sealed pouch.

Depending on the type of packaging, costs are increased between 6 cents and 35 cents per pound of fish. The extra costs are absorbed by customers who are drawn to the packages. Many packages carry a "sell by" or "use by" date, a meaningful alternative to packaging codes a consumer must decipher. Labels on prepackaged products are complete and accurate and also provide space for menu suggestions and recipes. Processors benefit by the ability to brand their product. They can engage in brand name promotions which yield more direct and measurable results than results of generic advertising.

Supplying a retail package rather than bulk cartons is also a plus in selling to retailers wary of handling drippy seafood with quick spoilage patterns. Aslanis Fisheries in Boston has had tremendous success distributing vacuum packaged fresh and frozen fillets and steaks of 24 different species under the Pier 12 label. Each package has an expiration date eight days after processing. Allowing a maximum of 24 hours to reach the retailer and another day to get the product on the shelf, Gus Aslanis figures the retailer has six days to sell it. "If a store cannot sell their product in five to seven days, they do not belong in the fish business," he says.

Most reaction to the Pier 12 brand has been positive. "Once the customer buys this package, there is no way on earth he will buy any other package," Aslanis claims. But the clean smelling, leakproof package has not been readily accepted in some areas adverse to change. "It doesn't look like it was packed in a place with a small station and sawdust on the floor by a guy in a filthy apron," he says.

Aslanis sells his vacuum packed *frozen* product as federally inspected Grade A merchandise under an inspection program initiated by the U.S. Department of Commerce. There is currently a moratorium on vacuum packed *fresh* fish being labeled Grade A because of a questionable safety factor of anaerobic storage. The possible danger is the same as that encountered by backflushing with carbon dioxide (see page 53), but of a lesser degree. Growth of aerobic spoilage organisms is delayed, potentially creating an environment in which botulin may grow yet the product does not appear to be spoiled. Aslanis circumvents the moratorium by labeling vacuum packaged fresh product as "packed under federal inspection."

On the West Coast, when the frozen salmon market boomed in 1979, vacuum packaging afforded processors a means of utilizing their crab brine freezers to freeze salmon. Packaging separates the salmon from the brine, eliminating salt uptake and foaming action in the brine tank. It also replaces glaze solutions, surpassing their ability to protect fish against oxidation and dehydration. Creating a vacuum eliminates interaction between atmospheric oxygen and unsaturated lipids, which results in oxidative rancidity.

Vacuum packaged frozen salmon have been held up to two years while glazed salmon commonly break down, chip or require reglazing after several months. Two years may seen unnecessary but frozen products may be stuck in distribution as long as six months and therefore require a long shelf life. Adoption of vacuum packaging by the seafood industry has proceeded slowly, as it did with the meat and poultry industries. Potential sales to seafood processors have created a minor war among increasing numbers of machine suppliers. The choice between machines or systems is dependent on costs, product form and volume. Costs range from $1705 for a small vacuum packaging machine to $200,000 for a complete line system including conveyors.

MARINE ANTENNAS

MORAD

MORAD antennas provide MOre RADiation

"CB"
MORAD groundless citizen band antennas are designed for the discriminating purchaser, desiring the utmost performance in a marine installation. Low angle of radiation and minimum resistive losses assure maximum range.

VHF
Constructed to MORAD's high standards for severe marine environment. VHF-156HD — Economy with High Gain.
VHF Deluxe — High Performance with Small Size.

MULTIBAND
MORAD's largest selection of models gives best performance on the required frequencies at lowest cost. For most effective operation a multiband antenna should be selected to provide only your operating frequencies.

MORAD
Electronics Corporation
1125 NW 46th Street
Seattle, WA 98107
206/789-2525

Circle number 55 on the Reader Inquiry Card

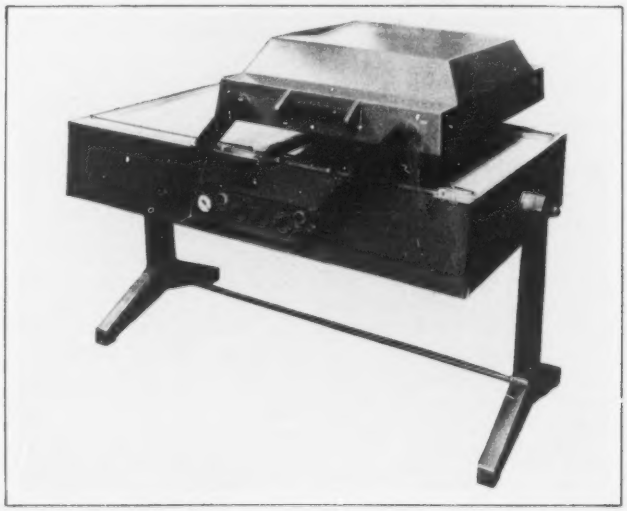
Two concepts are offered to processors freezing whole salmon destined either for export or for further processing in a more convenient location. The choice lies between a heat shrunk bag fastened by a metal clip or a hermetically sealed pouch which relies on outside air pressure pushing on a vacuum to give a tight appearance. The difference becomes apparent when the film is punctured. No matter which system is used, punctures are unavoidable, ranging as high as 20 percent in the salmon industry.

When a heat shrunk bag is punctured, overall appearance is retained. In fact one might not realize the vacuum has been lost. The system is offered by Cryovac, a division of the W.R. Grace Co. Salmon are placed in a multi-ply bag of 2.5 to 3 mils thickness. A vacuum is drawn and the bag is fastened with a metal clip. Prior to freezing the bag is run through a steam tunnel for 1.5 to 2 seconds and the film shrinks to fit the fish. Originally Cryovac experienced problems with pigmentation release. Scales peeled off with the package. Lowering and carefully controlling the temperature of the heat shrink solved the problem.

When a vacuum is pulled and the package is hermetically sealed, a puncture will release the vacuum, and the pouch fills with air. While intact,

FRESH FISH LASTS LONGER

When It's Vacuum Packaged On a Koch Multivac.



★ **FRESH PRODUCT:** Fresh fish keep well in our high vacuum package for up to 21 days from the day of the catch without loss of flavor or eye appeal. Eliminates freezer burn in frozen products.

★ **MANY MULTIVAC SIZES:** There are a dozen Multivacs that range from small production machines to giant machines capable of 60 packages per minute.

★ **KNOWN WORLDWIDE:** Koch Multivac machines are in use around the world and are currently operating on vessels as well as processing plants.

★ **MORE INFORMATION OR A PRICE QUOTE:** See us at Fish Expo booth 6117 or call us in Seattle at 206-763-1200 or 1-800-562-1062 (toll free in Washington State).

BIRKENWALD, INC.

Food Equipment Specialists for Over 100 Years

1-800-562-1062 **6000 6th Ave. S., Seattle, WA 98108** **Seattle: 763-1200**

Circle number 13 on the Reader Inquiry Card

the film is similar in appearance to Cryovac's barrier bag, but the heat shrinking process has been omitted. Instead, the difference between inside and outside air pressure causes the tight skin. Heat seals the pouch, rather than a metal clip. Machines which utilize this method are offered by Ludlow Packaging and Koch Multivac, among others.

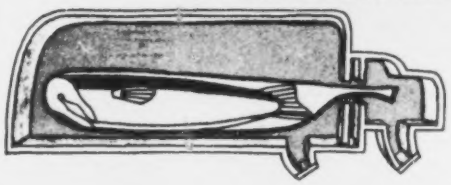
Hermetically sealed pouches use a heavier laminated film, 3.5 to 4 mils, as compared to Cryovac's barrier bags of 2.5 mils. Cost of the film is therefore increased but initial investment is less with a hermetic system which does not require a heat tunnel. Ludlow packaging will supply a remanufactured vacuum machine including a self-contained pump for $16,000. Cryovac spokespeople preferred not to put a price on their units because "it would vary all over the map." Cryovac offers complete systems, which may include several vacuum machines, conveyors and final packaging.

Processors who vacuum package portions may choose a roll stock machine, usually of German origin. Instead of a bag or pouch two layers of film fed from rolls run through the machine. A vacuum is pulled and a heat seal surrounds the product. The resulting portion is attractive, both to consumers and food service operators. "It's gorgeous," remarks Gus Aslanis, who uses a roll stock machine. He figures the packaging costs add an additional 6.5 cents per pound of fish to processing costs.

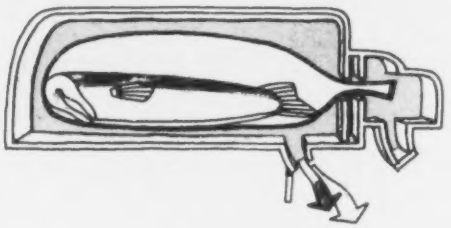
Use of one system does not eliminate the need for another. Peter Pan Seafoods vacuum packages whole salmon on a Cryovac system. Further processing takes place on a roll stock machine to supply controlled portions to both retailers and food service operators.

An alternative to vacuum packaging, without sacrificing eye appeal, is possible on a machine which is "starting to revolutionize the whole fish business," according to Lawrence Lazio of Lazio Fish Co. It is the Seafood Intact Packaging Machine distributed by San Francisco Trading Co. An oxygen permeable film meets a high gloss tray packed with seafood. Through a heat shrink seal the film adheres to the tray holding the seafood intact. "We are pleased with the appearance the package has and the uniqueness of having a breathable package," says Lazio who uses the machine for 20 percent of his production both in fresh and frozen form. Because the film is oxygen permeable no questions arise concerning the potential of botulin development in a fresh product.

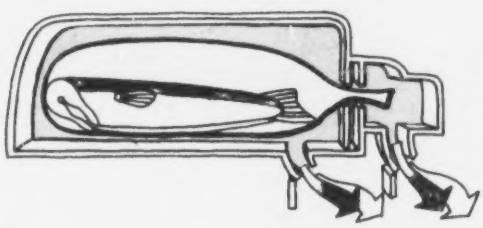
DOUBLE CHAMBER VACUUM SYSTEM



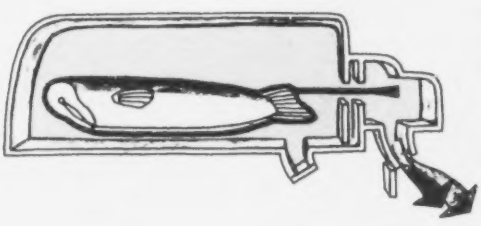
1. The bagged salmon is placed in the large chamber with the neck of the bag draped in the small chamber.



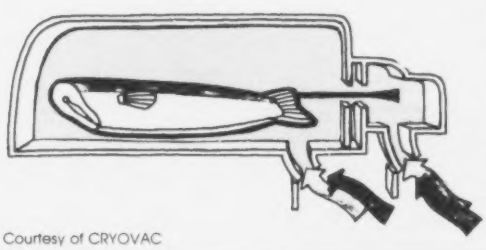
2. A low-level vacuum is drawn in the large chamber, causing the bag to balloon away from the product.



3. In sequence, a vacuum is drawn in the small chamber, while the vacuum level is held in the large chamber.



4. Evacuation of air continues in the small chamber until the vacuum level exceeds that of the large chamber, causing the bag to collapse firmly around the product. When the vacuum reaches pre-set levels, the bag is automatically clipped with a metal closure.



5. Air pressure in both chambers is then normalized. The machine opens and the package is automatically indexed onto the conveyor.

Courtesy of CRYOVAC

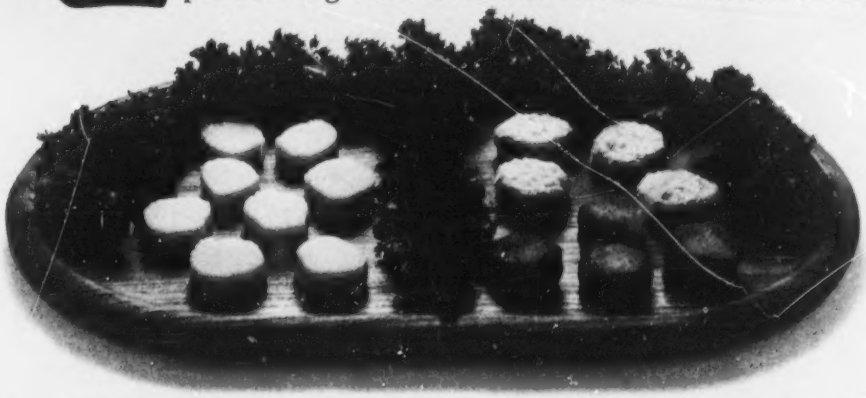
Fresh dover sole packaged by the Seafood Intact Packaging Machine outlasted a control sample two days in side-by-side shelf life tests by Lazio. He attributes the extra days to the film shielding the product from further bacterial contamination. Frozen fish has been found void of dehydration or freezer burn after nine months at minus 5 degrees F.

For top efficiency, a cutting machine is needed for use in conjunction with the packaging machine. "We have put it [the Seafood Intact Packaging Machine] on the back burner until we get a cutting machine because cutting the film is very labor intensive," says Frank Steuart of Steuart Seafoods, who plans to use his machine to package whole pink salmon.

The machine and film are manufactured in Japan where the system has been in use for eight years. It costs $34,500, an extra $5,000 for the cutting machine, 4 cents for film for each tray and 1.5 cents for each tray. Steuart estimates the cost to be 35 cents for each pound of fish packaged.

KIBUN™
Sea Bites™
(With Scallop Added) Can Be Used For Any Scallop Dish.
BREADED
POLLACK 60%, BREADING 25%, SCALLOP 7%, POTATO STARCH, WHEAT STARCH, SALT, SUGAR, EGG WHITE, SCALLOP EXTRACT, MONO-SODIUM GLUTAMATE
INGREDIENTS:
UNBREADED
POLLACK 85%, SCALLOP 10%, POTATO STARCH, WHEAT STARCH, SALT, SUGAR, EGG WHITE, SCALLOP EXTRACT, MONOSODIUM GLUTAMATE
• Produced By: KIBUN COMPANY LTD., TOKYO, JAPAN •
Imported By: KIBUN PRODUCTS INTERNATIONAL INC., LOS ANGELES, CA. 90013
KEEP FROZEN • NET WEIGHT, 4 lbs./1.81 Kg. (4X1 lb. Pkgs.) • KEEP FROZEN

Kibun Company LTD, the largest producer of processed seafood in Japan is proud to introduce Sea Bites™. This is a new exceptionally delicious seafood made with specially selected fish and scallop meat which is blended and then formed with perfect texture into portions resembling a white scallop. Sea Bites are fully cooked and then quick frozen to preserve their freshness. Sea Bites come breaded and unbreaded and allow 100% yield and perfect portion control, while costing less than half per serving than the domestic or Canadian scallop.



UNBREADED:

The unbreaded type of Sea Bites is fully cooked and has a nice white color. With no fishy aftertaste they can be used in countless seafood dishes. Their cooking versatility allows them to be broiled, lightly breaded and fried, or prepared to satisfy any successful menu.
Pack— 6/4/11b Approx. pieces per lb. 30-40

BREADED:

The breaded type of Sea Bites is fully cooked and then coated with a light Japanese breading (25%). This allows them to be deep fried to a delicious golden brown and served along with any seafood platter or adapted to other creative dishes on a menu.
Pack— 6/4/11b Approx. pieces per lb. 25-30

Circle number 48 on the Reader Inquiry Card

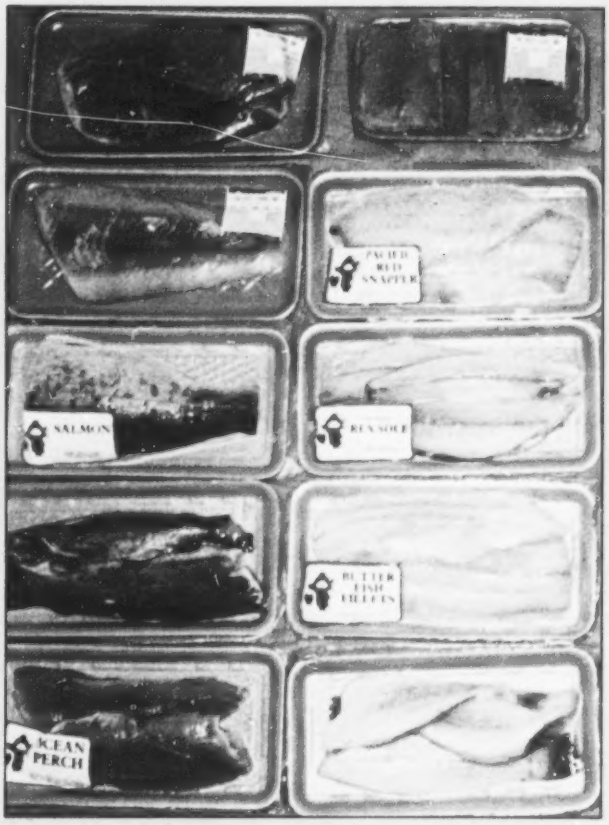
For more information on **Sea Bites**™ or **Sea Stix**™ (sea food with crabmeat) contact:
Kibun Products International, Inc., 150 South Los Robles Avenue, Suite 560
Pasadena, California 91101. Phone (213) 689-4331 TWX: 910-321-2005

COURTESY OF ASLANIS FISHERIES

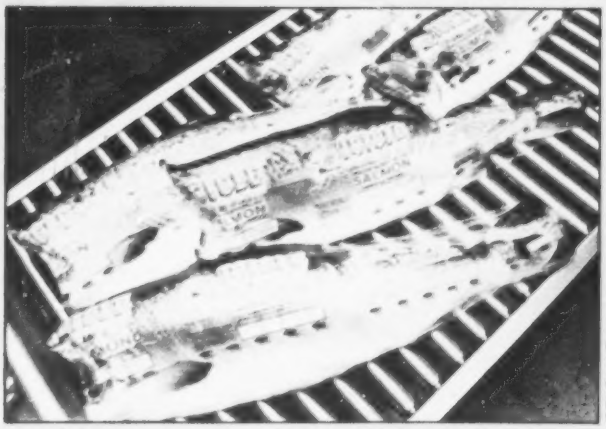
The Pier 12 brand, packaged by Aslanis Fisheries on a roll stock vacuum packaging machine, comes in a variety of cuts and species, fresh and frozen.

Barely detectable, oxygen permeable film covers tray packaged seafoods, below, packed on a seafood intact packaging machine.

COLOR PACKAGING



SAN FRANCISCO TRADING CO.

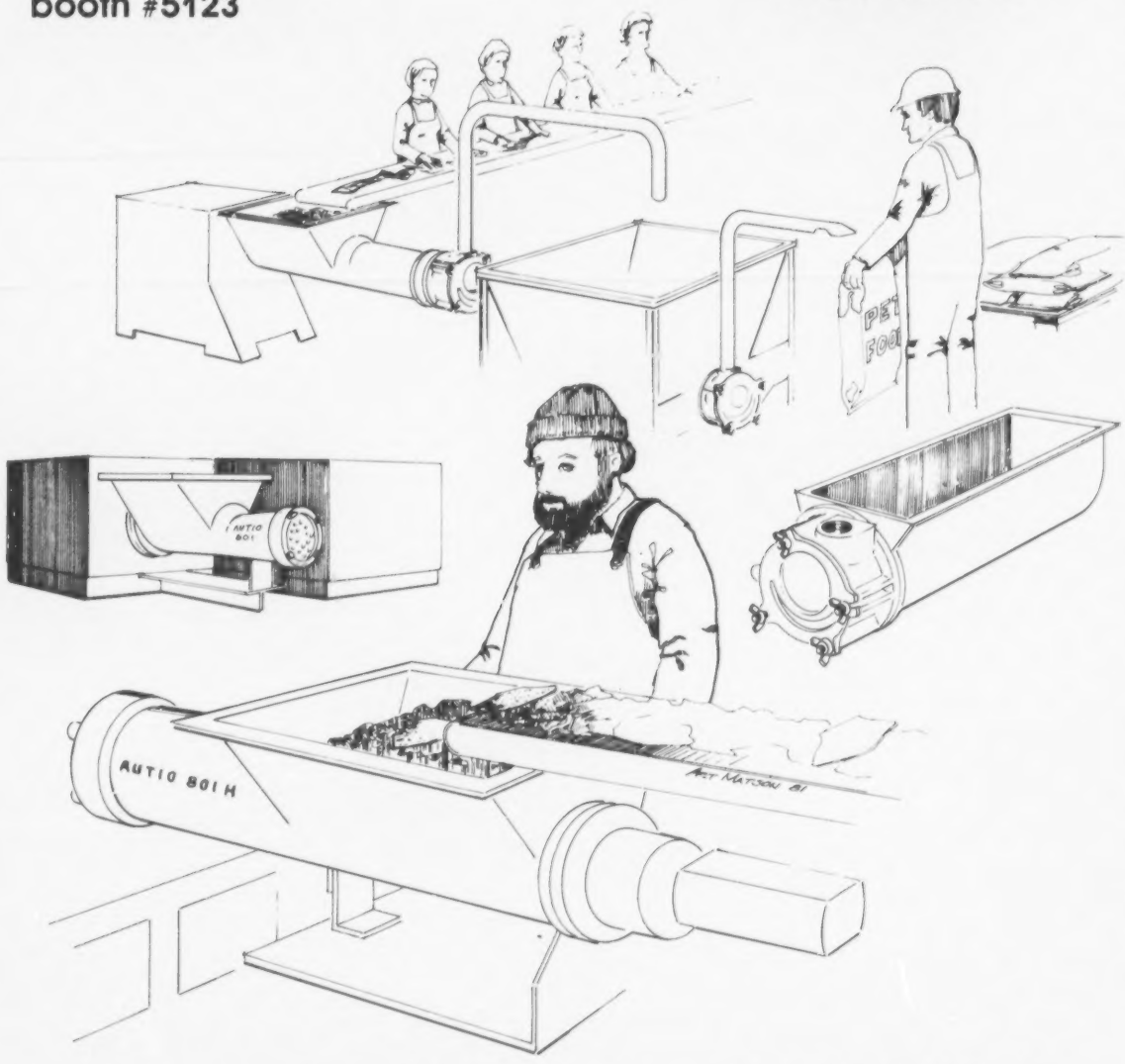


CRYOVAC

On top, a salmon within a hermetically sealed vacuum package. Outside air pressure holds the film tightly around the salmon. The alternative is shown in bottom photo. A metal clip fastens a pouch which has undergone a heat shrink process, forming a second skin around the salmon.

Those who know... specify AUTiO GRINDERS

See us at FISH EXPO booth #5123



Autio's equipment for the fish industry includes: Fish & Crab Shell Grinders, Pumps, Baggers, and Bait Grinders. The grinders are available in several sizes and in both electric and hydraulically driven models. Some of our satisfied customers include: Bellingham Cold Storage; Icicle Seafoods; Pan Alaska Fisheries, Inc.; Trans Pacific Seafoods, Inc.; Ursin Seafoods, Inc.; Dutch Harbor Seafoods, Ltd.; Universal Seafoods, Ltd.; and Peter Pan Seafoods, Inc.

AUTiO company
SPECIALIZED EQUIPMENT FOR THE FOOD INDUSTRY

Rt. 4, Box 480
Astoria, Oregon 97103 USA

(503) 458-6191
TWX 910 466 8010
AUTIO ASTO

Circle number 8 on the Reader Inquiry Card

IRRADIATION:

Bombarding Bacteria

Doubles Seafood's Shelf Life

The search for nuclear waste disposal sites could lead to the door of a seafood processing plant.

In their quest for ways to extend shelf life, seafood researchers have discovered that 99 percent of bacteria on seafood is killed or inactivated when subjected to low doses of electromagnetic rays. These rays can be obtained from recycled nuclear waste and, depending on the dose, can double and even triple the shelf life of fresh seafood.

Irradiation strikes a bacterial cell and damages its biochemistry, killing or crippling the microorganism. Reproductive processes and production of toxins come to a rapid halt. The same principle applies to use of irradiation in destroying cancer cells. Once the bacteria are destroyed, there is no way of telling irradiation has been used, except by the absence of bacteria. The only other method capable of killing bacteria is a heat process. Exposing a product to ionizing rays does not make it radioactive as only low intensity irradiation is used.

Approval by the Food and Drug Administration (FDA) of food irradiation was expected in the sixties. But questions remained regarding the potential for *Clostridium botulinum* to survive low doses of irradiation at temperatures above 38 degrees F. The process has been revitalized and is currently undergoing regulatory approval procedures. Food irradiation has been acknowledged as safe, but controversy remains concerning acceptable levels and labeling requirements.

Irradiation is measured in rads (radiation-absorbed-dose) according to amounts received by a target, determined by the intensity of the radiation and the time of exposure. In March the FDA announced acceptance of irradiation up to 100,000 rads, opening the field for public comments. Experiments performed at the National Marine Fisheries Service (NMFS) Gloucester laboratory by Louis Ronsivalli and John Kayler show an extra week can be gained for fresh fillets at such levels. But industry leaders have come back demanding higher doses.

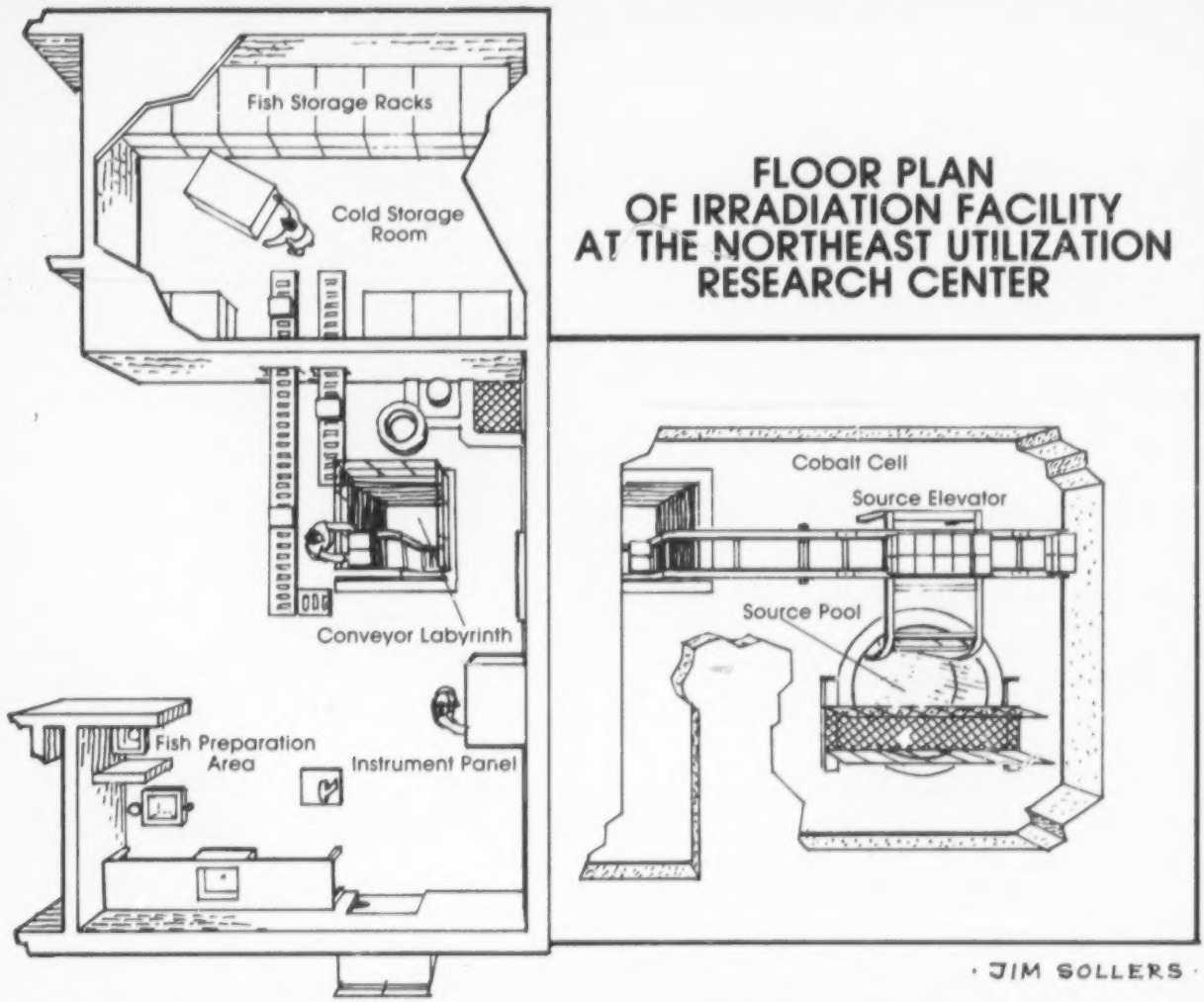
"We think there could be a tenfold increase in what they have proposed to adequately do the job the food industry needs," says Roy Martin, director of technology for the National Fisheries Institute.

The terms are ambiguous, according to John Kayler. "As you bombard any fish package, you will have an uneven distribution of the gamma rays. We have found, and the Europeans concur, that 175,000 rads are necessary at the point of minimum absorbed dose." Therefore, depending on the thickness of the food, the highest dose will be over 200,000 rads, double what the FDA has suggested. Kayler believes dosages should be declared as maximums or minimums.

At these low levels, 99 percent of bacteria, including *salmonella*, are killed. The National Food Processors Association (NFPA) has advised the FDA that irradiation below 3.5 megarads creates "an artificial condition in low-acid food where *Clostridium botulinum* can survive, grow and produce its deadly toxin without competition from flora which could overgrow and normally inhibit its outgrowth." The NFPA suggests the FDA adopt a generic policy for clearance of irradiating foods, establishing levels for each food group.

To sterilize a product, killing all bacteria, five million rads of gamma radiation are required because the last one percent are stubbornly resistant to destruction. Seafood irradiated with 100,000 to 200,000 rads show no side effects. But tripling the dose causes a change in taste and apearance. A dark fish such as a red salmon may bleach slightly and a white fish may darken. A peculiar odor sometimes remains with the product.

But, if fish is frozen and then subjected to high doses, no problems are



FLOOR PLAN OF IRRADIATION FACILITY AT THE NORTHEAST UTILIZATION RESEARCH CENTER

· JIM SOLLERS ·

encountered. Because the water molecules are not active at the time of exposure, oxidation is eliminated. Considerable interest in irradiation has been expressed by importers of frozen seafoods, especially shrimp importers. Numerous shipments from overseas have been rejected by the FDA primarily because of high bacterial counts. "If one considers shellfish and other crustaceans as entries separate from other fishery products, . . . the violative rate may be as high as 40 percent of the samples," reports Dr. Sanford Miller, director of the Bureau of Foods within the FDA.

Acceptance by the FDA of high levels of irradiation could provide smooth sailing for shellfish importers. In fact, there is considerable evidence Americans have already consumed irradiated shrimp. Frozen shrimp arrived in New York from India via Holland where it was exposed to irradiation to knock down the *salmonella* count. The FDA became suspicious because the bacteria counts were unusually low and the importer was forced to stop his operation.

New light has been shed on food irradiation on an international level as a result of a Geneva convention of the Joint FAO/IAEA/WHO Expert Committee on the Wholesomeness of Irradiated Foods. Representation included members of the World Health Organization, the International Atomic Energy Agency and the Food and Agriculture Organization. The committee recommended across the board clearance of irradiation at levels of one megarad or less, ten times the levels currently proposed by the FDA. The same scientific evidence will be examined by the FDA in reaching its final determination.

A long-term study conducted by the army experimenting on five generations of dogs may uncover some startling data on irradiation. "They are saying that there is no reason for not accepting over five megarads dosage levels," 50 times the current proposal, according to Niel Nielson of Emergent Technologies, Inc., who is familiar with the preliminary report. Consequently, Nielson believes the FDA "will come out very close to one megarad, if not one megarad."

The previous decade of anti-nuclear sentiment will probably hinder marketing an irradiated product in the U.S., especially if labeling is required on the retail package. Radiation was intentionally included in the food additive definition set forth by Congress in 1958 as an amendment to the Federal Food, Drug and Cosmetic Act. The act prohibits the use of new food additives until the sponsor establishes its safety and FDA issues a regulation specifying conditions for safe use. The FDA is considering labeling requirements for irradiated foods. Present regulations, which permit irradiation of potatoes to prevent sprouting and of wheat to stop insect infestation, require a label. Retail packages must declare "treated with ionizing radiation" or "treated with electron radiation." Labels on wholesale packages must read "treated with ionizing radiation — do not irradiate again" or "treated with electron radiation — do not irradiate again."

Irradiation's Effect on Various Seafoods

Product	Irradiation Dose (Mrad)	Extension of storage life (Days)	°C	(°F)
Haddock	0.75	39-49	0	(32)
Cod	0.25	45	0	(32)
Pacific cod	0.25	56	2	(35)
Pollack	0.25	21	2	(35)
Sole	0.25	35	1	(33)
Sole	0.2-0.3	24-32	1	(33)
Halibut	0.20	25	6	(42)
Halibut	0.20	15	2	(35)
Lobster meat (boiled)	0.25	166	2	(35)
Blue crab (cooked)	0.75	90	1	(33)
King crab meat	0.20	23-28	6	(42)
King crab meat	0.20	7-11	1	(33)
Raw shrimp (shelled)	0.15	10-15	1	(33)
Shrimp (cooked)	0.15	10-15	2	(35)
Clams (soft shelled)	0.50	119		

From: "Present Status of Radiation Preservation of Fish and Fishery Products in Europe" by G. Hobbs and J.M. Shewan.

"If you put on a label declaring that the food has been irradiated, people won't buy it," claims Roy Martin. "It is a food technology process and you don't buy a product that says how it has been processed." Products that are heat treated do not require a label and "therefore irradiated material should not need to be designated as such," agrees John Kayler. "However, given the general atmosphere and fear of nuclear energy, people get the wind up." Another commenter pointed out that a consumer may tend to confuse an irradiated product with one that is radioactive. And, since labeling is not required for other processing methods, he may believe he is buying a product processed by irradiation as opposed to one that has not been processed by any means.

Because there is no visual means of telling whether a product has been irradiated, Ronsivalli feels a label is necessary to prevent further irradiation. Otherwise, "a dealer could look at a fish, see that it is going bad and give it another shot," not necessarily a dangerous process, but one that is illegal.

One tack undertaken by Nielson, whose company is prepared to offer radiation services for processors, is to expose levels of radiation absorbed from microwave ovens and which occur naturally from the sun. He is telling the FDA, "If you force us to label radiation processing, then we intend to force you to put on that label how much dosage you get wher you put it (a fish fillet) in the microwave, how much dosage you get when you dry it in the sun, and, in the case of fruits, how much dosage they receive while growing in the sun." The numbers are astounding. One pound of fish will absorb 8 megarads of microwaves for each minute it is cooked in a 650 watt microwave oven.

Skepticism runs strong among scientists and processors regarding the feasibility of irradiating seafoods. Establishing a radiation facility is costly. Twenty years ago the irradiator set up in Gloucester's NMFS lab cost the Atomic Energy Commission $600,000. Costs of the curies of Cobalt-60 is additional. At that time the price was 50 cents a curie and 250,000 were purchased. Today "you are looking at five or six million dollars," according to Nielson.

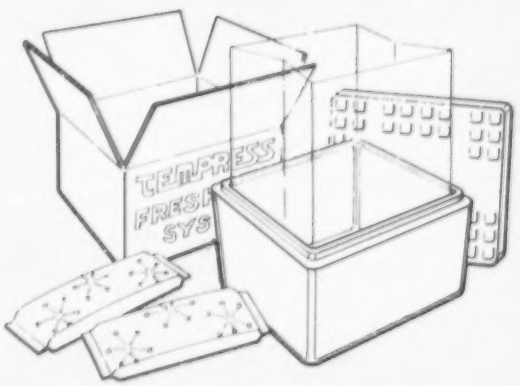
The process is feasible if offered as a service in a centralized location such as Gloucester where large quantities of groundfish are processed and stored. For a certain price per pound, a processor would deliver packaged seafoods to an irradiation facility which could work in conjunction with a warehouse system.

On the West Coast Nielson's company, Emergent Technologies Inc., has already secured contracts to support 20 percent capacity of an onshore facility. The economics are such that the irradiator must be in use 24 hours each day. "Onshore where we see other use potential in the area, we would fund and create the plant," says Nielson. Cost of the service would vary depending on the dose and contract size. "At 200,000 rad doses with a significant volume coming through, the price could be as low as 2 cents per lb." One thousand tons of product a day can be irradiated at such a dose. Most interest has been expressed by overseas companies with frozen shrimp, mahi mahi or frog legs they would like to export to the U.S. Domestic processors with fresh product have also expressed interest. "Some of the others are going to be caught flat-footed," believes Nielson.

The feasibility of placing irradiators on barges for use in remote areas has been explored by Emergent Technologies. To fund such a project guarantees for 100 percent capacity would be required. Nielson suspects the Russian mothership operations are currently irradiating fish. "All the scientific indications are that they have irradiators onboard, but the Russians will neither affirm it or deny it," says Nielson. "We don't see how else they can handle the fish the way they are handling it as far away as they are handling it."

The future of irradiation as a seafood preservation process will be determined by the FDA. Approval and safety regulations "must go through the whole administrative bureaucracy" a spokesman from the FDA warns, referring to the time consuming process. Fertile medflies may hasten the approval process. The state of California is forming a state legislature on food irradiation, to promulgate its own regulations. Post-harvest irradiation could replace chemicals currently in use to fumigate vegetables. For effective fumigation, ethylene bromide must be applied at 70 degree F temperatures for a minimum of 5 hours, cutting shelf life 25 percent. Irradiation not only would replace the chemical but also extend the shelf life of vegetables.

FRESH-PAK SYSTEM



- **PAK ICE**..... Efficient refrigerant gel
- **FILLET BOX**... 25 Lb. capacity, insulated shipper with stacking lugs
- **POLY PAK**..... Gusseted 2 mil liner
- **OVER PAK**..... 125 Lb. test corrugated, complies with airline regs.

TEMPRESS

701 S. Orchard, Seattle, WA 98108
1-800-426-2600 / 1-206-762-1410

Circle number 78 on the Reader Inquiry Card

Unisea
Dutch Harbor
First Names for Quality from the
Alaska Shellfish Specialists
ALASKA KING CRAB LEGS AND CLAWS
READY TO SERVE
ALASKA KING CRAB Fancy MERUS LEGS
ALASKA SNOW CRAB MEAT
ALASKA KING CRAB MEAT
ALASKA SNOW CRAB COCKTAIL CLAWS
ALASKA KING CRAB BROILER CLAWS
ALASKA KING CRAB SPLIT LEGS

Universal Seafoods, Ltd. **Dutch Harbor Seafoods, Ltd.**

Plants located at Dutch Harbor, Alaska and Redmond, Washington

REPRESENTED EXCLUSIVELY BY

Intersea Fisheries, Ltd.®

4225-23rd Ave. W., Seattle Washington 98199 (206) 285-5630. Telex: 32-1256 (UNISEA SEA)
New York Office: 1345 Avenue of the Americas, New York, N.Y. 10105
(212) 586-7676. Telex: 237487 USL UR Cable (UNIFISH)

Circle number 44 on the Reader Inquiry Card

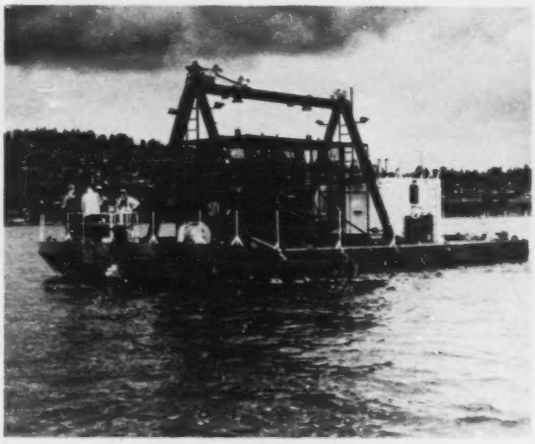
CARBON DIOXIDE ATMOSPHERES:

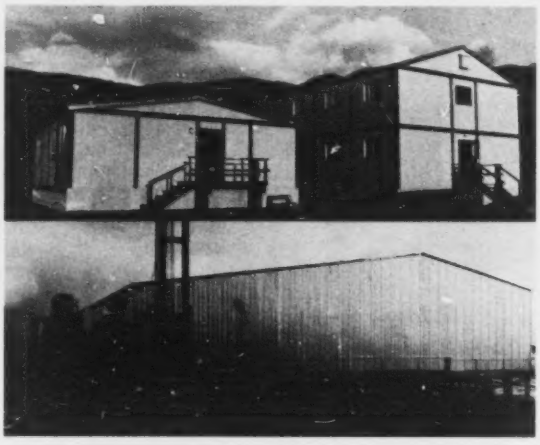
Use with CAUTION on Seafood!

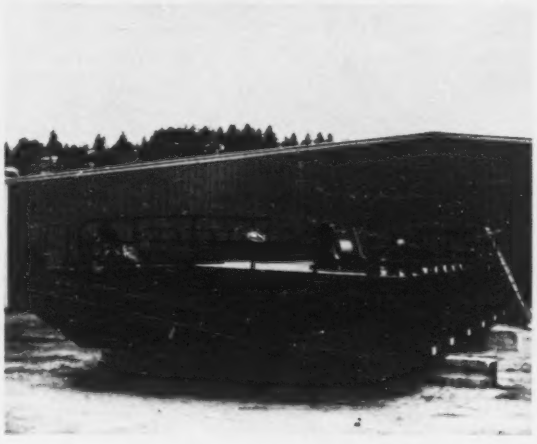
Frank Perdue gets more life out of his chickens. Washington state apples are fresh year round. Carbon dioxide atmospheres may take credit. The seafood industry once hoped modified

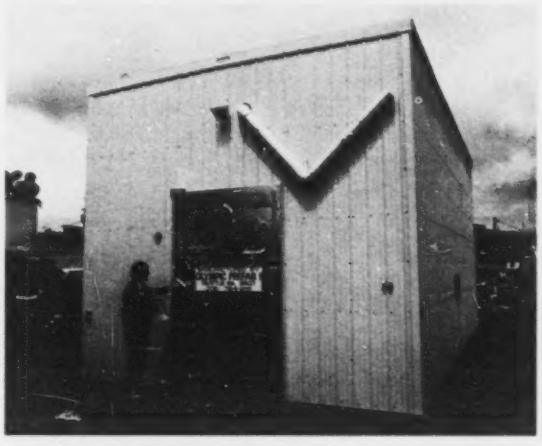
atmospheres could be the panacea for overcoming the perishability of seafood. But optimism and the use of carbon dioxide atmospheres have dwindled. Processors and suppliers are now approaching the system cautiously trying to stay on top of problems inherent to it.

Carbon dioxide atmospheres may be modified or controlled. Whether a 40-foot van or a retail package, the atmosphere within a sealed container may be altered by pulling a vacuum









If it Houses, Processes, Feeds, Freezes, Floats and Stands Up to Alaska's Torture...

Olympic Builds It!

Contact Olympic — the Full Service Fabricator/Contractor for the Fishing Industry in the Northwest and Alaska.

Olympic Prefabricators, Inc.

610 N.W. 44th Street • Seattle, Washington 98107
(206) 784-9111

"See Us At FISH EXPO Booth #20."

Circle number 60 on the Reader Inquiry Card

and backflushing with an inert gas mixture. A modified atmosphere has been charged once, after which the composition of the gas changes as it interacts with the fish. A controlled atmosphere is monitored on a constant basis. Sensors detect the concentration of gas and feed gas into the atmosphere in order to maintain correct percentages. Currently, most atmospheres in use are modified.

The applications vary tremendously, depending on the type of container and the mixture of gas. Backflushing with carbon dioxide is popular because it effectively inhibits bacterial growth. The amount of microbial outgrowth is completely dependent on the concentration of carbon dioxide. In laboratory experiments by Harold Barnett and associates of the National Marine Fisheries Service (NMFS) in Seattle, freshly butchered salmon were graded as acceptable after 21 days in a modified atmosphere containing 90 percent carbon dioxide, compared to a normal shelf life of 12 days for salmon held on ice. The scientists found that use of modified atmospheres should begin with salmon of the highest quality, thoroughly washed and prechilled prior to containerization. Temperatures must be maintained below 35 degrees F during transit.

The controversial problem encountered in using a carbon dioxide modified atmosphere is the possibility *Clostridium botulinum* type E may grow on a piece of fish that has been stored above 38 degrees F and does not appear to be spoiled. If consumed in the raw or lightly cooked state, the fish could cause severe botulism food poisoning.

Clostridium botulinum is more likely to grow in a carbon dioxide atmosphere because its competition has been eliminated. Normal spoilage bacteria are aerobic, requiring oxygen to survive. Replacing oxygen with carbon dioxide inhibits growth of these bacteria which normally produce the ammonia-like odor indicating the product's shelf life has come to an end. In their place other organisms have a chance to grow. The change in bacterium does not indicate to the consumer the previous storage conditions of the product.

Both marine and freshwater environments contain *Clostridium botulinum* type E. It is a nonproteolytic botulinum, meaning it does not attack proteins. Types A and B botulinum, more commonly associated with meat, poultry and produce, degrade proteins and peptones, producing ammonia as a by-product. With these types of botulinum, spoilage often can be detected. The toxin from type E is only produced at temperatures above 38 degrees F and it is destroyed by proper cooking.

Opinions regarding the potential hazard of a retail package backflushed with carbon dioxide vary, ranging from, "they [processors] are fooling around with a stick of dynamite" to "the product is going to be in such bad shape that nobody in his right mind would eat it raw." Recent research performed by Dr. Mel Eklund, a NMFS microbiologist, confirms the former opinion. Freshly caught coho salmon were placed in impermeable containers and backflushed with 90 percent carbon dioxide. Abused at temperatures of 77 degrees F, *Clostridium botulinum* type E toxin was produced in 24 to 48 hours. Spoilage had not advanced to the state of recognition. When fish were stored at temperatures of 50 degrees F, toxin was produced in 10 days. Again, the products were acceptable. At 42 degrees F, there was no problem with the toxin. Eklund maintains that use of carbon dioxide in a modified atmosphere is "an excellent process"; but it "should be approached with an open mind, determining parameters that are essential for a safe process." He urges caution.

The most dangerous application is use of a retail impermeable bag containing 100 percent carbon dioxide, because the chance of temperature abuse increases when products leave the controlled conditions of a processing plant. Temperatures were taken of retail-level refrigeration units for a survey conducted by the American Meat Science Association. Of stores surveyed only 47.5 percent held their product below 40 degrees F, 35.8 percent held some products over 45 degrees F, and 20 percent had products stored over 50 degrees F. On top of that, "consumers have been known to abuse fish to a grosser point than professionals," believes Larry Bell of Transfresh Corporation.

For this reason Transfresh has taken a conservative and cautious approach with seafood. "Our approach is to go only in large refrigerated containers with moderated temperatures where we know nothing can get away from us," says Bell. "Once the van is opened, the atmosphere is gone." Transfresh Corp. sells the carbon dioxide atmosphere to customers shipping salmon from Alaska who wish to beat the high cost of flying. The customer lines up the van and steamship company and for $450 per van Transfresh modifies the atmosphere. For a van loaded with 35,000 lbs. of salmon in totes and wetlock boxes, the cost is less than 2 cents per lb. In the end, savings of ocean freight over air freight ranges between 10 cents and 15 cents per lb.

Salmon are flown to Anchorage in the round where they are butchered and chilled. Because the quality of the roe suffers in modified atmospheres, fish are not gassed in the round. Boxes or totes of butchered salmon are loaded in refrigerated vans which are sealed, gassed and shipped by sea to a plant for further processing of the salmon.

Discoloration in salmon has dampened Swiftsure Fisheries' enthusiasm for modified atmospheres. "We've gone back to flying it out, doing whatever we can to avoid the atmosphere," laments Dean Kayler of Swiftsure. Swiftsure has severely curtailed use of modified atmospheres,

Salmon-filled totes complete a van-load, ready to be sealed and flushed with a carbon dioxide atmosphere prior to shipment.

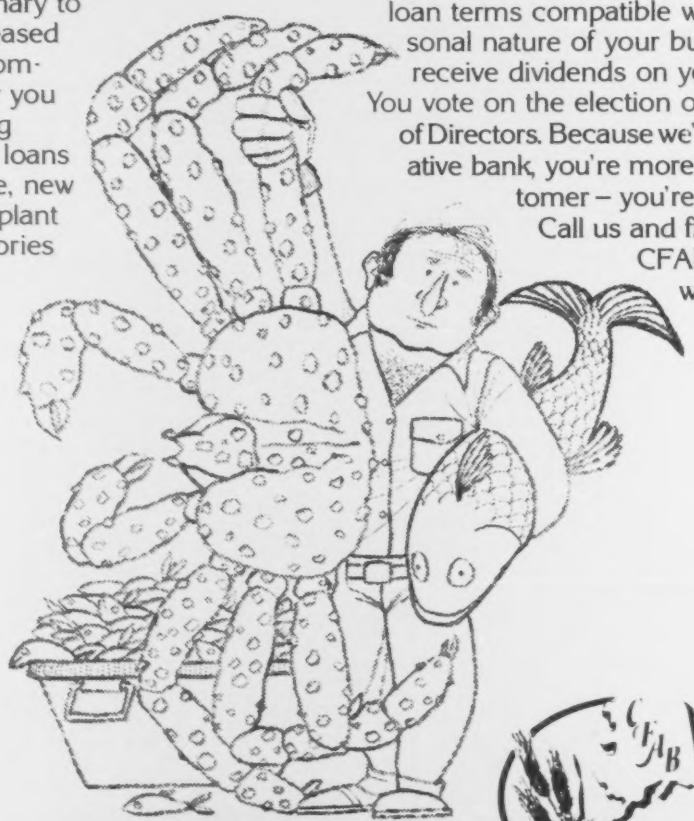
You wouldn't buy your supply of seafood from a Sunday fisherman.

Why get your processor loan from an ordinary bank?

CFAB is definitely not an ordinary bank. We deal only with Commercial Fishing and Agriculture. To maximize the earnings of the seafood processing industry we have gone beyond the ordinary to provide you with increased loan limits at highly competitive rates. Whether you are canning or freezing your product we have loans available for real estate, new and used equipment, plant expansion, and inventories and receivables.

And that's just the beginning of your financial strength.

At CFAB you are definitely not an ordinary customer. When you borrow you get loan terms compatible with the seasonal nature of your business. You receive dividends on your interest. You vote on the election of the Board of Directors. Because we're a cooperative bank, you're more than a customer – you're a member. Call us and find out how CFAB can go to work for you.



Commercial Fishing & Agriculture Bank

2550 Denali Street, Suite 1201
Anchorage, Alaska 99503 (907) 276-2007

Branches also in
Cordova, Homer, Kodiak and Seattle.

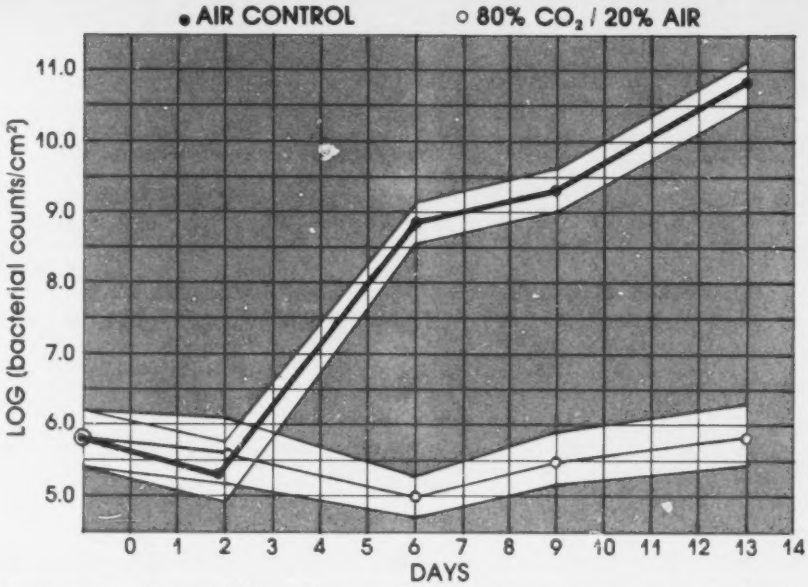
Circle number 20 on the Reader Inquiry Card

shipping only two van loads during 1981's salmon run, compared to one million pounds shipped in atmospheres last season.

Quality suffered when exposed portions of the salmon such as the belly well were marked by browning. Browning, caused by oxidation, occurs when fish are not immediately cooled after harvest. The first 12 hours are extremely critical, and unfortunately use of ice is not typical onboard salmon gillnetters. Except for pink salmon and except in certain fish producing areas which affect the biochemical state of the fish, oxidation can be avoided by immediate cooling and maintaining temperatures below 35 degrees F, according to Bell of Transfresh.

Within their own custom processing plant in Anchorage, Transfresh is experimenting with a bag-in-box approach compatible to bulk transportation within modified vans. Through the use of a specific packaging film with permeability properties, precise control of gas mixtures can be assured. A package is flushed with a certain gas mixture, sealed with a clip, and placed in a carbon dioxide modified atmosphere van. The clips may leak but the system is designed to be temporary. Once the packages are removed from the van, the carbon dioxide dissipates. Currently the system is in a test mode, not available commercially. Once offered commercially, immediate chilling after harvest would not be as critical to ensure high quality. Discoloration should not occur. Costs will increase, but one could still expect savings over air freight.

A similar operation has been underway in Brownsville, Texas, for two years. At the Pace Fish Co., retail packages are placed in a master carton which is backflushed with carbon dioxide. Not only is the shelf life extended two or three days, but buyers who previously would not touch fresh fish find the packaging convenient.



Carbon dioxide's inhibiting effect on bacterial reproduction in cod fillets is shown by comparing bacterial growth under normal atmospheric conditions with that in a modified atmosphere.

"It is a selling item for us," says company owner Pat Pace. "There is no drippage or smell from wet ice and fish liquids." Master cartons may be placed directly in the retailer's meat cooler. The retailer breaks the seal when he needs to replenish supplies and the gas dissipates.

Pace distributes a fraction of his output under modified atmosphere conditions: about 2,000 lbs. a week out of 40,000 to 50,000 lbs. But he has infiltrated fresh fish among retailers previously averse to handling fresh fish. As he says, "It is better than nothing."

Nearby, at Texas A & M, experiments have revealed exciting results in the number of days gained from a product under *controlled* atmosphere conditions. Under the guidance of Dr. Ranzell Nickelson, Gunnar Finne is testing a flow-through atmosphere with a continuous flow of specified gas. Swordfish steaks and shrimp were found to be in as good a condition as they were on day one after 14 days in a controlled atmosphere. Finne plans to adapt the process to use onboard. He envisions an entire ship's hold backflushed with carbon dioxide.

Because of the controversy surrounding carbon dioxide modified atmospheres, a moratorium on their use exists on products packed under the federal government's Grade A inspection program. There is agreement that further research is necessary prior to approval. Unfortunately research on one species of fish cannot be applied to another species. Unlike the classes of beef and poultry, among which members are similar biochemically, fish differ in their reactions to certain processes Growth in the use of modified or controlled atmospheres in the seafood industry will be hampered by these differences.

NORTHERN PRODUCTS CORPORATION
ROBERT E. DIGNON,
President
Distributors
American and Canadian
Salmon
TELEX: 32-1073
705 Terminal Sales Building, Seattle, Washington 98101
622-6677
Circle number 59 on the Reader Inquiry Card

Harris Electric, Inc.
Fishermen's Terminal
Seattle, WA 98119
See you at
FISH EXPO
in
booths #636, 638
"Have you seen the Fox?"
(206) 282-8080
Circle number 39 on the Reader Inquiry Card

O_3ZONE:

Electrified Oxygen Attacks Bacteria

Add another atom to an oxygen molecule and you have ozone (O_3), electrified oxygen. But don't expect it to hang around long, because ozone spontaneously reverts to oxygen. Expose bacteria to ozone and they die, yet finfish and shellfish acting as a bacterial substrate remain unharmed. In addition to destroying microorganisms, ozone increases dissolved oxygen in water and attacks nearly all organic compounds, such as ammonia.

Ozone may be captured in ice because it readily dissolves in water. Salmon, two days after harvest, were placed in plastic bags, some containing ozonized brine ice, others untreated brine ice. Held at ambient temperatures, the untreated fish were judged to be spoiled after four days, while the ozonized fish remained fresh for seven to eight days. Results of the experiment, performed by Bill Nelson at Campford Fisheries in Homer under the guidance of ozone expert and NMFS microbiologist Dr. Walter Blogoslawski, may herald a preservation technology with numerous applications for the seafood industry.

Ozone has been recognized as a sterilizing agent since 1929 and is currently in use as a water disinfectant. It imparts no taste or odor to water in which it is dissolved. The cities of Paris and Montreal opted to ozonize their drinking water in lieu of adding chlorine. Ozone does not last long in water, quickly bubbling off as oxygen. Depending on the temperature and amount of organic matter present, it may remain dissolved for 15 to 30 minutes, posing a problem for large-scale water systems. Should water pipes burst, bacteria could infiltrate an unguarded water system. Chlorine maintains a residual in inactive form, providing protection. Thus the cities of Paris and Montreal add a small amount of chlorine after ozonizing their water.

Ever wonder how the brewers of Miller beer get away with clear bottles, while other brews hide behind tinted glass? Miller's brewing water is ozonized. Bottled water is also ozonized before it is capped, creating its blue hue.

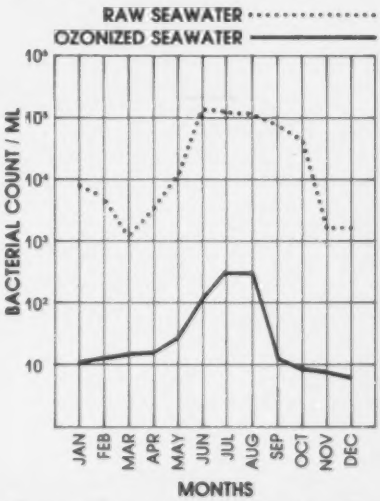
More important is ozone's ability to deactivate paralytic shellfish poisoning caused by red tide phytoplankton by-products. "Toxic clams exposed to ozonized seawater for two weeks exhibited rapid detoxification in all tissues examined," reports Blogoslawski. Ozone has been shown to inactivate both botulism toxin and polio virus. It has been used for years as a water disinfectant in mariculture operations, killing bacteria, fungi, and viruses more rapidly than do other oxidants.

Only recently has technology advanced in the areas of gas production, measurement and application, prompting research in seafood preservation. One potential application currently under investigation by Bill Nelson of Campford Fisheries is to inject ozone into the water supply of a processing plant. Ozone would act as a sterilizer in the plant's wash-down water and in water used to slime fish, glaze fish, cool shellfish after cooking, and to make ice.

Ozone is more readily captured in the frozen state. If current studies prove its longevity, ozone ice could be substituted for untreated ice, on board, in the plant, and throughout seafood's distribution chain. Nelson approaches cooling fish with the assumption that skin and scales are protective insulators. Since bones conduct heat or cold as metals do, cold air displaces heat faster if applied from the inside. Nelson envisions an ozonized freeze foam which would fill the bellies of fish soon after they are bled and gutted.

If concentrations are accurately controlled, ozone atmospheres, similar to carbon dioxide controlled atmospheres, may be possible. An ozonator installed under the refrigeration unit of a van loaded with 42,000 lbs. of fish allows ozone to penetrate the fish, killing bacteria. The danger of botulism toxin production is eliminated, if indeed ozone deactivates the toxin.

But precise control is necessary because "in high enough concentrations ozone will kill, just like carbon dioxide," says Blogoslawski. Highly reactive as a gas, ozone can be explosive with a spark or electric discharge. When ozone is injected into a water supply, no problem with toxicity exists because only small amounts will dissolve in water.



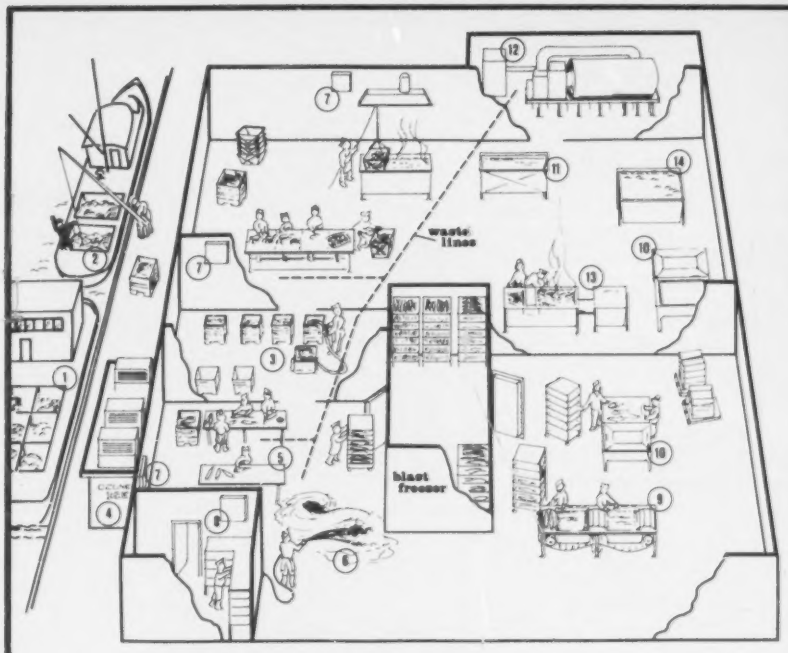
There is a 2- to 3-log bacteria reduction in ozonized seawater compared with raw seawater. Certain species of bacteria are totally eliminated by dissolving ozone in seawater, but the species Pseudomonas *remains.* Source: *World Mariculture Society.*

The Food and Drug Administration currently limits ozone generation in public areas to 0.05 ppm concentrations. The public is frequently exposed to much higher levels. A copier machine emits 0.1 to 0.2 ppm ozone. During a transatlantic flight a person picks up 0.4 to 0.5 ppm ozone. Inhabitants of Los Angeles are exposed to 1.0 ppm ozone routinely, with each smog alert.

Ozone generators sold as odor neutralizers or smoke eaters are limited to industrial applications or use during off-hours in public areas. One such machine is the Sonozaire, sold by Howe-Baker Engineers, Inc., of Tyler, Texas. The smallest model, sufficient for use with a van's refrigeration unit, measures approximately 22 x 24 x 9 inches and costs $595. Cost of a device which measures the amount of ozone in the air and shuts the machine off at sufficient levels is $1800. Additional technology is needed to bring the price of the metering device nearer the cost of the ozonator itself. A complete system capable of injecting ozone into a water supply costs $10,000.

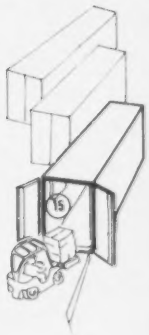
An ozonator generates ozone by subjecting air to an electric discharge. A blower forces air between two electrodes. By applying 6,000 to 30,000 volts to the electrodes, oxygen in the air is transformed into charged atoms or ions. The air space turns fluorescent violet because of the electric current conducted by the ions. Ions recombine to form a triatomic molecule, ozone.

Current research utlizing ozone as a preservation agent is cautiously labeled preliminary laboratory work. Although Blogoslawski believes "ozone holds great promise as a disinfectant for ice used to preserve fish," he feels extensive biochemical work is needed to determine ozone's reaction with lipids and the biochemical changes a fish undergoes. Research at Campford Fisheries continues.



POTENTIAL OZONE APPLICATIONS ON BOARD, IN THE PLANT, AND DURING TRANSPORT

1. Fish tender — ozone gas bubbled into seawater for product storage.
2. Live crab boats — ozone gas bubbled into tanks to keep crab alive and eliminate ammonia from holding tank.
3. Ozone gas in slush ice to chill totes for staging.
4. Ozone ice on all incoming and outgoing fresh product. As ice melts, ozone is released killing bacteria and viruses on contact.
5. Slime tables and rinse tank with ozone sterilizing water.
6. Ozone water for washdown.
7. Wall-mounted ozone generator to eliminate odor.
8. Wall-mounted ozone generator to eliminate odor and retard bacterial growth in egg room.
9. Double-dipping glazing tanks with ozonated glazing solution.
10. Vacuum-pack, ozone-flush packaging machine.
11. Cooking tank for cooked crab with ozonated chilled water.
12. Waste plant using ozonation to control odor and prevent putrification of fish wastes.
13. Ozonated water for peeling and cooling shrimp.
14. Ozonated refrigerated brine tank, keeping tank clean and extending freezer life of shellfish product.
15. Ozone generator mounted in refrigerator vans generating ozone for fresh finfish and shellfish shelf life during transport.



Courtesy of PACIFIC OZONE, INC.

FISHING VESSEL OWNERS MARINE WAYS

FISHERMEN'S TERMINAL, SEATTLE, WA.
206-282-6421 206-283-6700

Circle number 32 on the Reader Inquiry Card

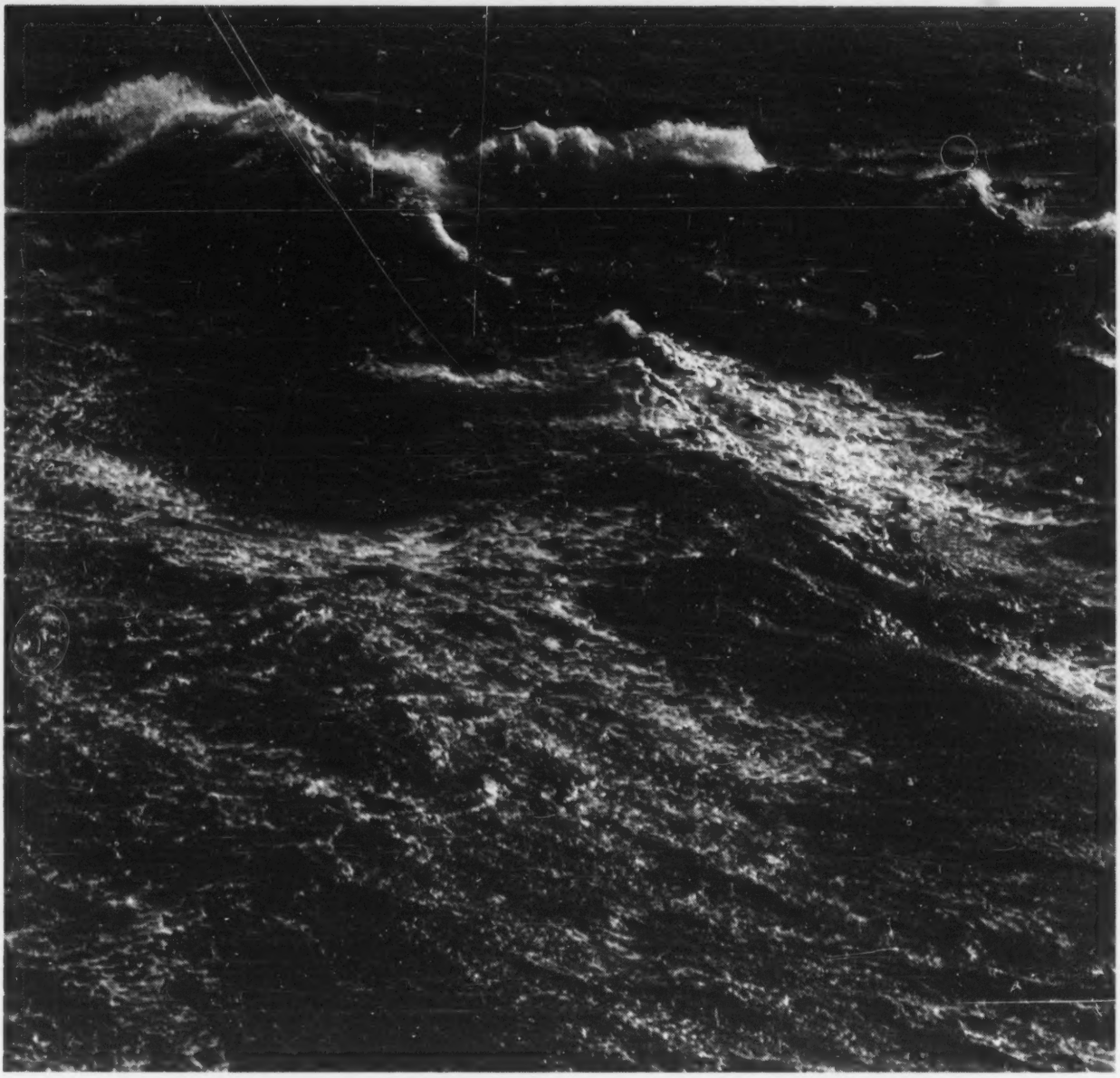
ALASKAN

Producers of Quality Alaskan Cod & Pollock Fillets / Shrimp / King, Snow and Dungeness Crab / Scallops / Halibut / Salmon / Herring

Alaska Food Company, Inc.

Plant: Box 1335 / Kodiak, AK 99615 / 907-486-3287
Anchorage: 835 W. 9th / Anchorage, AK 99501 / 907-272-3409
Seattle: 5501 6th Ave. South / P.O. Box C-81411 / Seattle, WA 98108 / 206-767-9544

Circle number 3 on the Reader Inquiry Card



TO GET A SIMPLE YES OR NO ABOUT A MARINE LOAN, YOU SHOULDN'T HAVE TO WAIT 'TIL THEY RAISE THE TITANIC.

In any business, time is money. But this is particularly true in the fishing industry where you're involved with a limited production period, runs and regulations. As a result, when there's a need for financing, there's a need for a quick response.

Seafirst Commercial Corporation is set up to give you a quick response, with an absolute minimum of red tape.

As an affiliate of Seattle-First, the largest bank in the Pacific Northwest, we know the area, we know the marine industry. And we're specialists in providing financing for every kind of income-producing equipment.

We're flexible, very flexible. We're here to do one job and do it well: to be a source of financing that can be depended upon in good times or bad.

We'd like to help you. We have money for new and existing vessels, conversions, debt refinancing, working capital, as well as floating and on-shore processing units.

So, just keep Seafirst Commercial in mind when you need financing. Call H.C. "Hank" Huntington or Barry Bevis at (206) 583-4831.

They won't leave you at sea, waiting for an answer.

SEAFIRST COMMERCIAL CORPORATION

2025 112th Avenue NE, Suite 302, Bellevue, WA 98004

Circle number 71 on the Reader Inquiry Card

ADDITIVES: One Solution for Preserving Fish

"With movement towards formulated products processed from minced fish, we will see an increased use of chemicals as additives to seafood," comments Dr. Jerry Babbitt from the National Marine Fisheries Service laboratory in Seattle. Treatment of fish with chemicals is not widespread among seafood processors. Companies have vacillated between dipping and not dipping over the past two decades.

As the industry moves towards full utilization, processors will be looking at chemicals to stabilize and improve the quality of minced products. Use of antioxidants will increase because of the numerous cut surfaces exposed to oxidation in minced flesh. As any observant consumer may see by reading labels, the meat and poultry industries have taken full advantage of chemicals in their formulation of new products.

Depending on the concentration of each chemical used, additives can delay microbial outgrowth, enhance color and flavor, reduce drip loss, prevent dehydration, and inhibit oxidation of unsaturated fats. Applied at high percentages, side effects are noticeable. A product may bleach or become glossy or slippery. Used improperly, some chemicals leave a taste. Determining the appropriate application, which may vary with each species, is the key to use of additives.

It is possible to extend the shelf life of fresh fillets up to a week longer with solutions formed from the family of benzoates. Proper pH levels and low temperature control are necessary to ensure maximum effectiveness. To apply the additive, fillets are dipped, sprayed or tumbled.

Processors may choose to manufacture a solution themselves or purchase a branded product from a chemical company. A combination of sodium benzoate, benzoic acid and salt can be mixed and added in the processing plant at minimal cost.

Fran-kem, distributed by Seafood Preservatives, Inc., in powder form, has been in use for 20 years. It is composed of sodium benzoate to inhibit bacterial growth and fumaric acid, a fungicide which prevents mold. Sodium benzoate does not transfer flavor, but if over-mixed, the fumaric acid imparts an acidic taste to the product. Proper solutions are important. Salt is added to hold temperatures close to freezing. If the pH level rises above 3.5 to 4.0, the level of maximum effectiveness, citric acid may be added to the solution to make it more acidic. One pound of Fran-kem treats 240 lbs. of water and costs $2.24.

Installing a combination of valves and an additional tank for roughly $100 provides a means to meter Fran-kem into an ice machine. Not only will the preservative effects of the chemicals be absorbed by fillets held on Fran-kem ice, but Fenton Prehn of Seafood Preservatives claims the ice will last longer because it is not exposed to heat producing bacteria.

With more fish prepackaged in the processing plant, reduction of water loss becomes more important. A fillet, packaged at the plant, may soon be swimming in its own water. And it cannot be drained at the retail level as are bulk packages. Suppliers of bulk packages are also concerned with drip loss because they must calculate net weight throughout the product's shelf life, and increase poundage as compensation to comply with specified weights. Phosphates offer a means of containing free drip, solving the problem of package appearance and the weight loss. Phosphate interacts with surface protein and forms a gel which seals in moisture.

The use of phosphate is self-limiting. High concentrations will cause a fish to taste like soap. Appearance is not altered in a cooked product but a raw fillet takes on a glossy and slippery look. Considering that restaurant meals account for more than two-thirds of seafood consumed in the United States, the glossy effect in phosphate-treated fillets may not be a deterrent. "If we can get a chef to accept a product that can sit in his refrigerator without developing odor or drip, he would be happy," believes a supplier of phosphate treatments.

Phosphate use is more prevalent in frozen fish than in fresh fillets because of its effect in reducing thaw drip. Problems of oxidation in frozen fish may be eliminated by addition of antioxidants, such as ascorbic acid. Side effects vary depending on species. Ascorbic acid effectively maintains the natural color of rockfish fillets during iced storage; but at high concentrations, it turns English sole fillets green and cooked pollock fillets yellow.

All additives are subject to control by the Food and Drug Administration (FDA), and may be subject to stricter and varying regulations by county and state governments. The FDA has established a GRAS list, meaning the additives listed on it are generally regarded as safe. All of the above mentioned chemicals are on FDA's GRAS list. Maximum percentages are specified for certain chemicals. Sodium benzoate, for example, is limited to 0.1 percent in solutions.

The Canadian government allows only phosphates to be used in processing fish. However, Fran-kem, containing sodium benzoate may be in use. "Our product gets up there indirectly, but not directly," says Fenton Prehn.

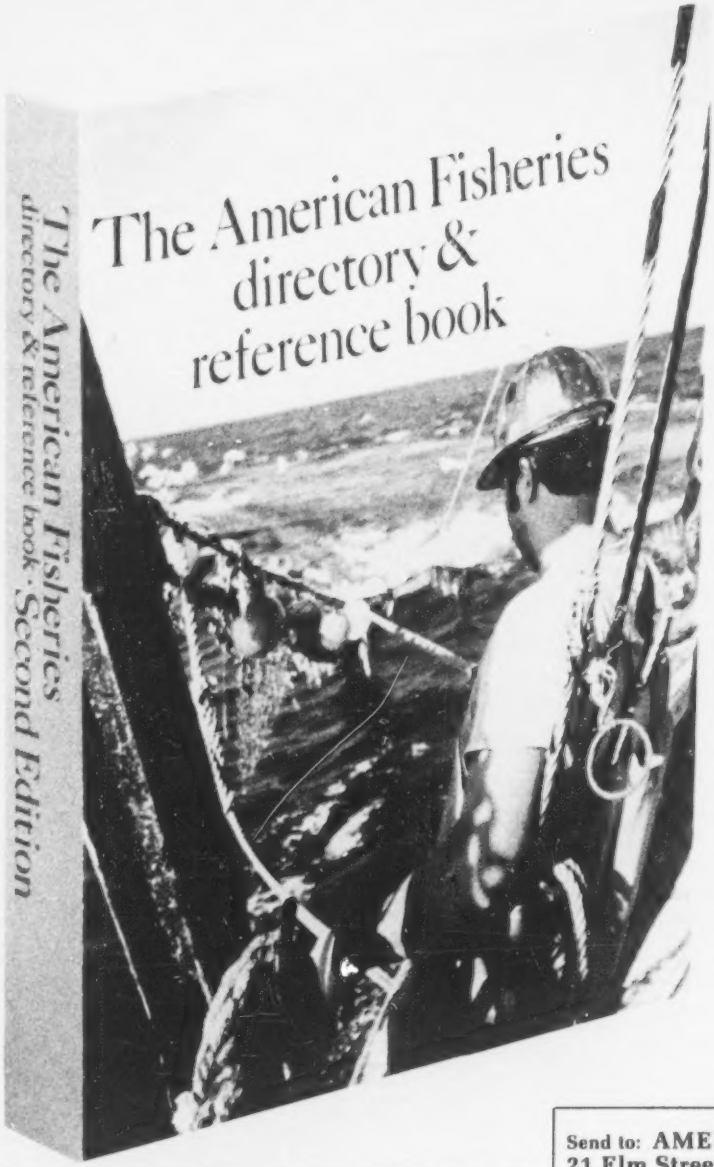
Because a residual remains on fish after applying most dips, the ingredient must be labeled in order of its predominance on the package, according to FDA labeling requirements. What if the fillet is not packaged, as in the case of fillets sold over the counter in fish markets? "This is a gray area," as one preservative supplier described it. An FDA spokeswoman feels a consumer should be aware of additives in case he must limit his intake of sodium ions (chemicals are commonly used in the form of salts). Washing fillets before cooking will remove most residuals, a practice consumers should be aware of.

Chemicals are commonplace in packaged foods and may become more prevalent in seafoods. "There are people who don't want to have anything added to their fish," observed one supplier. "But, especially in the Midwest there are people who don't even have fresh fish available. If it's a choice between no fresh fish at all, or a fish that tastes good, looks good and keeps well under refrigeration, a consumer should have a right to make an informed choice."

If you want to do business in the American

FISHERIES...

Here's the Book that tells you



- WHO
- WHAT
- WHERE

FOR THE ENTIRE INDUSTRY!
NEW 1981 EDITION AVAILABLE NOW!
THOUSANDS OF LISTINGS INCLUDE:

- Manufacturers, dealers, and distributors of commercial fishing and vessel gear
- Processing, packaging, and handling equipment
- Aquaculture equipment and supplies
- Boatbuilders and repairers
- Naval architects, marine surveyors, and vessel brokers
- Federal and state government agencies
- Government and private sources of marketing and financial assistance
- Fishermen's associations and organizations
- U.S. importers of fish and seafood products
- Boat and equipment leasing

— and much, much more!

The American Fisheries Directory and Reference Book is an indispensable tool for anyone whose business is in the U.S. fisheries. It tells you where to go for equipment, services, and information. It lists what's available in all 50 states; where to obtain it; where to sell it; and whom to sell it to.

For your copy of the second edition of The American Fisheries Directory and Reference Book, fill out or copy the adjacent form.

Send to: AMERICAN FISHERIES DIRECTORY
21 Elm Street, Dept. NF, Camden, Maine 04843

SEND ME _____ copies of Hardcover Edition @ $55.00 (U.S.)

_____ copies of Softcover Edition @ $42.00 (U.S.)

For delivery in the U.S., please add $2.00 per book for postage and handling. Outside U.S., and airmail, please add $9.00 (U.S.) per book.

TOTAL ENCLOSED (check or money order) $ _____

Name _____

Address _____

City, State, Zip _____

Circle number 6 on the Reader Inquiry Card

BLANCHING AND RSW:

Temperature Shock May Be Applied On Board

Biologically accustomed to life under the seas, bacteria can be shocked out of existence by temperature extremes, hot or cold. Enzymatic activity is also inhibited by severe temperature change. The earlier the temperature shock is applied, the more days on the shelf can be gained.

Refrigerated sea water (RSW) systems on board both salmon tenders and groundfish trawlers reduce fish temperatures soon after harvest. Counting on temperature's effect on the other end of the scale, scientists and processors are blanching fish, both on board and shoreside.

Blanching involves immersing a whole or gutted fish in 190 degree F water for two seconds. Temperature shock resulting from transfer from cold to hot water deactivates enzymatic reactions. At the same time 99 percent of surface bacteria are removed by eliminating the slime layer protecting the fish's skin. Three days of shelf life have been gained on whole fish in laboratory experiments conducted by professor Robert Zall and Stephen Kelleher at Cornell University.

Ten days of shelf life are gained when fillets are blanched, but B.C. Research concluded that, although effective, the process can be detected in the fillet's appearance. Blanced fillets may be acceptable to food service chefs, but are apt to be rejected by the discerning public.

Processors in Maine and Cape Cod are installing blanching facilities shoreside to treat whole fish upon delivery. Testing cod and hake, Zall and Kelleher discovered the optimal time for blanching is one or two days after harvest, leading to experiments on board. Heat captured from engine-cooling water is a possible source for heat required to blanch whole fish.

While the bugs need to be worked out of on board blanching, superchilling on board can boast 40 years of experience proving its value. Mechanical refrigeration chills sea water, lowering temperatures to 24 degrees F. Addition of salt lowers water's freezing point. Bacterial and enzyme action are effectively delayed.

Refrigerated sea water offers advantages over traditional icing: more rapid cooling, less labor in stowing the catch, and elimination of damages caused by ice pressure. Plus, the systems already exist on crab vessels. As they target on bottomfish, trawlers delivering to Alaska Food Co. in Kodiak are easily converted from crabbers utilizing existing RSW systems.

"In order to get this industry started one has to adapt to methods that are available," comments Pete Harris, Vice President of Alaska Food. "Our experience with RSW fish has been better than with iced fish because freezing soon after it is caught adds quality. The crew can get the fish down below a lot faster, just sliding it down hatches."

Icing catches of pollock and cod limits trips to seven or eight days at the outside. RSW trawlers have held cod as long as 10 days, and the quality is better.

Cod are bled and gutted, a tank is filled, salt is added, and the temperature is lowered to 24 or 25 degrees F. The "frozen at sea fish," as Harris describes his product, are delivered to the plant where they are partially thawed for processing. Filleting is easier because the muscle tissue remains stiff.

A topnotch refrigeration system is required to reach such temperatures. In fact, 5.8 times the refrigeration capacity is required to cool a fish from 50 to 26 degrees F than is required to cool from 50 to 30.5 degrees F, due to the amount of latent heat that must be removed to freeze 70 percent of the water in the fish. The lower temperatures eliminate belly burn in cod. Except for short trips and harvesting fish which have not been feeding, a simple chill to 30 degrees F will not prevent belly burn, according to Harris.

Others believe 29 degrees F is the optimal temperature for RSW systems. Depending on the time involved, 25 degrees F can be the worst possible holding temperature, according to Richard Nelson of the NMFS. At 25 degrees F tissue freezes, then breaks down when thawed. Normal trips at Alaska Food Co. run four to five days, and such a problem has not occurred. "Our customers are delighted," says Harris. "We've got codfish sold way ahead."

Salmon supplement output while Alaska Food expands its bottomfish capacity. Bristol Bay reds are run to Kodiak in RSW tenders and then frozen. Maximum RSW time is 10 days.

In 1980 Canadians also cashed in on the Bristol Bay bonanza, successfully transporting 3.8 million lbs. up to 2000 miles using RSW systems. Traveling time normally ran 12 to 14 days, with a maximum of 16 days. Salmon were graded "good" but were only of canning quality partly because of salt uptake from the brine and partly because of poor handling before delivery to the Canadian tenders. To compensate for salt uptake, the amount of salt added in canning is adjusted.

Buying the salmon for 57 cents per lb., processors estimated its worth at $1.00 per lb. landed at the plant, by 1980 fuel prices. Since 1980 yielded a poor harvest from Canadian waters, the costs were offset by higher production. And the alternative was paying each salmon's airfare.

Can you spot your favorite fishing ground in this picture?

Epsco can.

With more Loran C receivers and track plotters than anybody.

Which means we've got exactly what you need.

For example, choose from three sensitive receivers and two accurate plotters. Including our NMEA award-winning C-Plot 2. All ideally paired because nothing drives an Epsco plotter like an Epsco receiver.

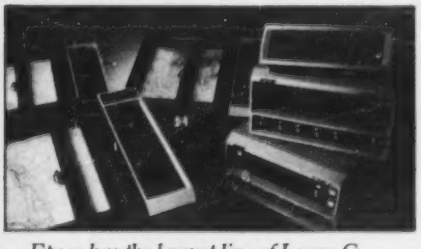
With one manufacturer, there's never an interface problem.

You can also choose our brand new combination receiver/plotter. The Epsco C-Plot RX. A complete navigation system in one compact unit.

Epsco has a proven product line. Offering the widest possible selection. And one of the biggest service and support organizations anywhere.

Stop in at your local Epsco dealer today. You'll find exactly what you're looking for in Loran C equipment and accessories. For confidence out there.

To get a free copy of our article, *"Savings in Energy and Time Through Advanced Techniques in Loran C Navigation,"* write: Epsco Marine, 411 Providence Highway, Westwood, MA 02090.



Epsco has the largest line of Loran C receivers and plotters available anywhere.

EPSCO

Epsco Marine, 411 Providence Highway
Westwood, MA 02090 (617) 329-1500
Seattle New Orleans Halifax

See us at Fish Expo
booths #704, 706, 708, 710, 712, 603, 705, 607, 609, 611

Circle number 29 on the Reader Inquiry Card

Invitation to West Coast Shrimp Breaders and Processors

The National Shrimp Breaders and Processors Association is asking the West Coast shrimp industry to take an active role in the Association.

"Although the Association is very active throughout the breaded shrimp industry," writes Don Toloday, Association president, "it has achieved very little representation from the West Coast. We would like to see members of the West Coast industry participate in the next annual convention this coming May 14 and 15." Toloday is vice president, production, for Singleton Packing Corp.

One of the early accomplishments of the Association, formed in 1957, was to formulate and have accepted the Standard of Identity for Raw Breaded Shrimp. The standards of quality established by the Association are held paramount by an internal monitoring committee that resolves problems among packers. The Food and Drug Administration uses those standards as an aid to its activities.

"The technical committee," Toloday writes, "has gone to bat for the entire industry on many occasions. Liaison with the FDA through the technical committee helped to establish good manufacturing practices for the food industry and has many times come to bat to avert legislation and rulings that would have been disastrous to the whole shrimp industry."

The Association's next annual convention will be held at the Wigwam in Litchfield Park, Arizona, May 14 and 15, 1982. On the program will be guest speakers addressing such topics as economics, financing, technical aspects, management and marketing. Research sponsored by the Association will be reported and new projects will be discussed.

Further information on the annual convention may be requested from Jim O'Leary, convention chairman, National Shrimp Breaders and Processors Association, Inc., c/o Golden Dipt Corp., 211 Armour Dr., Dunedin, FL 33528.

Information on Association membership may be requested from Jonathan Golden, Esq., Arnell, Golden & Gregory, 10th Fl., Fulton Federal Bldg., Atlanta, GA 30303. □

(REFRIGERATION cont. from p. 20)

microsomal fraction that converts TMAO and DMA to formaldehyde has been isolated from red hake muscle. This reaction is widely believed to be responsible for toughening, and, within the isolated fraction, something that produces this reaction obviously is taking place.

The final session, entitled "Quality and Utilization of Seafood," featured a discussion of the Quality Assurance Program conducted by the National Marine Fisheries Service's Gloucester Technological Laboratory. The program has shown a rapid and sustained increase in sales of seafood bearing the Grade A quality label. Laboratory director L. Ronsivalli stated that the major problem preventing unlimited expansion of the program is lack of suitable supplies. Fish should not be more than two days old before they enter the processing plant. Ronsivalli called for new thinking about the role of fish caught by offshore vessels to ensure high quality.

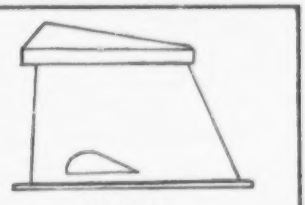
To obtain a copy of the proceedings of the conference, write to IIR, c/o ASHRAE, 1791 Tullie Circle, N.E., Atlanta, GA 30329. □

—John Sackton

Oregon Processors Challenged by Scallop Stock Discoveries

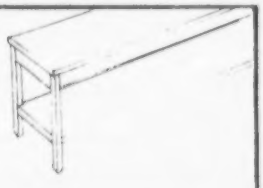
Last April when the first tows off Coos Bay brought up 55,000 pounds of Oregon scallops, it was the start of a brand new fishery. In the next three months more than 13 million pounds would be landed, with about 8 million coming from the Coos Bay beds. Scallops had never been fished commercially in Oregon and neither the fishermen nor the processors were prepared to deal with large amounts of this fragile seafood.

Those first tows were shucked on-board the East Coast vessels that caught them and sent to markets in the East. However, within a few days



STACKS

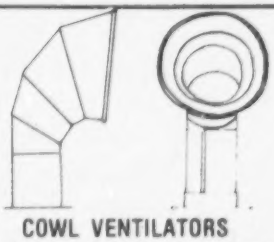
72 x 52 x 41 height
54 x 39 x 33
48 x 27 x 33
45 x 27 x 24 height
30 x 20 x 15
Or to your specs



PROCESSING EQUIPMENT

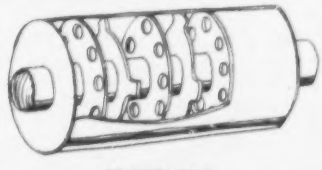
CARTS PANS CABINETS
TRAYS BINS STANDS
TABLES TOTES RACKS

If It Can Be Made Of Sheet Metal, We Can Fabricate It!



COWL VENTILATORS

Let us know your ventilation needs, and we can fabricate vents for your vessel. Some sizings in stock.



MUFFLERS

Our Marine and Heavy Equipment Mufflers are available for either dry exhaust or wet exhaust systems. Need engine(s) make, model, h.p., and space limitation requirements to fulfill your order.

Ballard Sheet Metal Works

Serving The Pacific Coast Commercial Fishing Industry
For Over 70 Years
See Us At: 4763 Ballard Avenue N.W.
Seattle, Washington 98107 Phone: (206) 784-0545

Circle number 10 on the Reader Inquiry Card

as many as 60 local vessels joined the scallops fleet, and they turned to their traditional processors for handling and marketing.

"The boats were getting in and out so fast we didn't jump in right away," says Tom Bourns of Eureka Fisheries in Coos Bay. "We just sort of felt our way in. We have our own restaurants and retail outlets so our market was ready-made. When the head office discovered we didn't have any scallops for our restaurants, they told us to get started processing."

Further down the bay, at TAP Seafoods, Doug Stafford says, "We had a lot to learn about handling, and we learned a few expensive lessons. During the first few weeks we lost money. Now we can do the same amount and make money. We would like to be buying 50,000 pounds a day, five days a week."

The new fishery didn't work out for everyone, though. At Hallmark Fisheries in Charleston, Oregon, scallops processing lasted only a week and a half.

"It wasn't feasible for us to stay in," says Hallmark's manager Harold Dietrich. "We have a union shop, and it was costing us more to process them than we were making. Also, we just didn't know anything about it."

For those plants that did stay in, getting started was the easy part. The only expenses for the plants were the knives used for shucking and enough additional personnel to handle the job.

"Because it was so new, we had to learn as we went along," Stafford

BUOYS, FENDERS & FLOATS

SCANMARIN

Affiliated with Bakelittfabrikken A/S
Oslo, Norway
Scanmarin, Inc.
2 Central St.
Ipswich, Mass. 01938
Phone: 1-800-225-0570

Circle number 67 on the Reader Inquiry Card

Hydraulic Systems, Components, Machinery, Equipment

See us at FISH EXPO booths #5120, 5122, 5124, 5126

BEVIS & ASSOCIATES, INC.

1904 Stewart St. (206) 383-5761
Tacoma, WA 98421 (206) 622-2684

Circle number 12 on the Reader Inquiry Card

FAST ON-TIME TRANSPORTATION

Specializing in fast, on-time transportation of fresh and frozen seafood products from points in Washington and Oregon to California markets.

- LTL and TL Service
- No minimum on pick-ups
- Fully insured carrier
- Dual temperature trailers
- Refrigerated terminals
- Pool shipment handling
- Serving packers, brokers, and distributors of all seafood products in Washington, Oregon, and California

206 748 8877

Sorenson Transportation Co., Inc.
632 N.W. Averill St., Chehalis, WA 98532

— Serving the Seafood Industry Since 1970 —

Circle number 74 on the Reader Inquiry Card

reflects. "We had to learn how to cut a scallop, and then we had to teach our people how. It was a learning process for everyone."

Bourns says at Eureka they found an East Coast fisherman to show them how to shuck a scallop and then "loaded the tables and let them go at it. Now we have some people who can put out 14 to 15 pounds an hour."

In the beginning few fishermen knew how delicate a product scallops are, and in the process of learning they sent some bad bags of meat to markets in the East. This poor product soured those markets and limited the delivery of most Oregon scallops to the West Coast. That didn't affect most Oregon processors, however, except to make them very cautious about buying scallops that were processed onboard.

"We started by buying them in the round because we felt that onshore processing is better, since we have better quality control. Some of those guys were going out and making eight-day trips and not getting them iced soon enough, or not getting them clean enough. I had some that were 14 days old and the flavor was completely gone," Bourns says.

Stafford also went to onshore processing, saying, "There are a lot of bad scallops out there. I think we are the only plant that hasn't had a problem with bad ones. That's because we are very careful, very picky."

Markets haven't been a problem for the processors despite the reluctance in the East. TAP has been selling its product to supermarket chains in California. Says Stafford, "The controller strike has really opened up the Los Angeles markets because they can't get them from the East Coast. There isn't any air freight moving. We never tried to market them in the East, but I think the problem there is the difference in price. They can buy East Coast scallops cheaper than we can afford to ship them there."

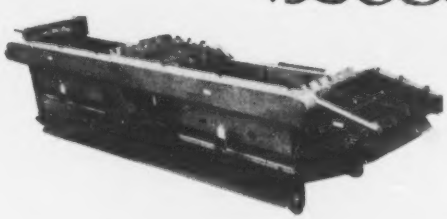
One of the problems with processing scallops is a very low profit margin. Recovery runs between six and seven percent, and with the labor-intensive shucking, making a profit becomes an art.

"The cost of the product is high, mainly due to so little recovery," explains Bourns. "We were paying the fishermen 20 cents a pound (in the round), which was the minimum they could operate on, and that didn't leave us much room for profit."

The price for scallops has fallen from a high of $5.10 to $2.50 a pound, and the beds seem to be at least temporarily fished out. Still, most processors agree the advent of scallops saved them, and some fishermen, from a disastrous shrimp season, and they are hoping this delicacy among seafoods will be a part of their business permanently. □

— Jerry Capps

Coastline Equipment, Inc.



See us at FISH EXPO booths #965, 967

Double Dip Glazer

From individual pieces of equipment to complete lines, Coastline can fill your seafood processing needs.

If you are concerned about prices, design, craftsmanship and service, check with us before you order.

SALMON & BOTTOMFISH
Processing & Handling Equipment
Unloading Buckets • Glazers
Fillet Lines • Inclined Elevators
Holding & Chilling Tanks • Totes
Egg Tables • Packing Tables
Sliming Tables • Conveyers
Freezer Pans • Butcher Tables
Freezer Racks • Roe Agitators

CRAB
Processing Equipment
Meat Extration Equipment
Live Bottom Cookers • Baskets
Continuous Cookers • Chillers
Butcher Hoopers • Splitters
Brine Freezers • Cutting Lines
Coolers • Glazers • Boxing Lines
Washers • Conveyers • Gillers

2235 E. Bakerview Road
Bellingham, Washington 98225
(206) 734-8509

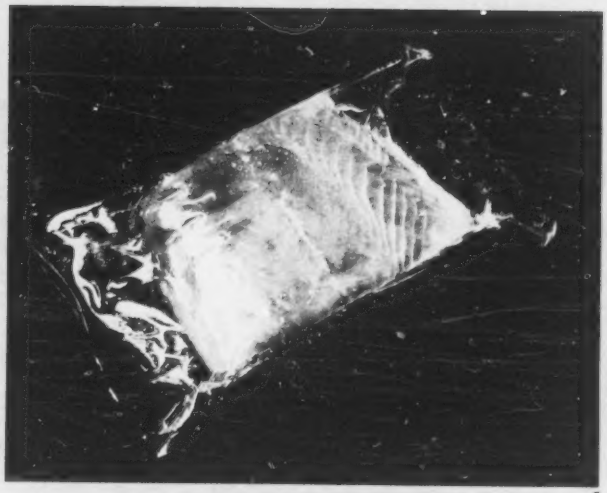
Circle number 19 on the Reader Inquiry Card

FDC® INSULATED AIR FREIGHT CARTONS

- LEAKPROOF, WEATHER-PROOF
- ONE—WAY, DEPENDABLE SHIPPERS
- 6 SIZES IN STOCK FROM 0.4-4.0 CU. FT.
- 3 CUSTOM SIZES FOR SALMON
- PERFECT FOR FRESH OR FROZEN CRAB, SHRIMP AND FISH

CALL OR WRITE: **FDC PACKAGING INC.**
MARC FORREST, MANAGER
P.O. BOX 1017
PETERSBURG, ALASKA 99833
PHONE: (907) 772-4545

Circle number 30 on the Reader Inquiry Card



1

1. Salmon in a package

Peter Pan Seafoods of Seattle, Wash., has recently introduced a new product to the national frozen salmon marketplace: fresh frozen, pre-cut individual sockeye, chum and silver salmon steaks and fillets.

Using a Tiromat 560L Roll Stock vacuum package machine for packaging these portion-controlled steaks and fillets, Peter Pan Seafoods says it is able to pass on some important benefits to its customers: longer shelf-life (up to a year or more); fast, no-mess thawing, faster preparation time; less waste and spoilage; protection against freezer burn and dehydration; consistency of quality, supply and portion size.

For the food service industry, says Peter Pan, this adds up to fewer deliveries and, in the long run, better inventory control.

The steaks are available in single eight-ounce packages, double six-ounce portion packages or multiple packages. Fillets are available in double four- or six-ounce packages, single eight-ounce packages, random-weight single fillet packages (6-14 ounce) or multiple packs.

After being introduced nationwide to the food service industry, Peter Pan Seafoods portion-controlled salmon is now being test marketed for consumer use in several major supermarket chains.

According to Bill Bowman, Sales Manager for Peter Pan's Fresh & Frozen Divisions, there has been a steady growth in the amount of salmon utilized for the portion-controlled market since this project began. Although the process is now being handled by Peter Pan's Seattle plants, the company is investigating the possibility of the eventual transfer of this operation to its Alaska fishing facilities.

Another area under consideration is the utilization of salmon parts that have traditionally been considered "trim" and waste (fins, tails, backbone meat, etc.) in the form of salmon paste and pate.

Circle number 61 on the Reader inquiry Card.

2. Off to Mexico

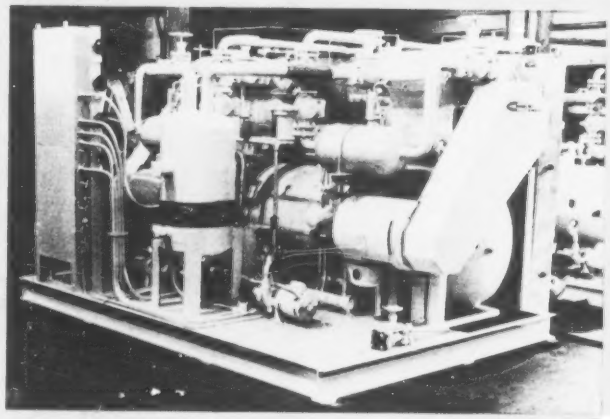
Pictured here is the first of 16 ammonia refrigeration systems manufactured by Cryoquip of Gardena, California, for Astilleros Rodriguez in Mexico. Each system will provide 64 tons of refrigeration aboard tuna jigboats.

Cryoquip's system is prepackaged and tested at the factory prior to shipping. The envelope size of the package was designed to meet the space requirements dictated by the shipyard. The shipyard chose to buy the prepackaged and tested system rather than purchase the components and install them, because of the overall cost savings and added reliability of a unit built and tested at the factory.

Cryoquip's system uses two four-cylinder compressors, each driven by a 50-hp motor at 1000 rpm. The condenser is a box-type design with the ammonia in the tubes and the sea water in the box. All the pressure vessels, including the condenser, are built by Cryoquip. The control system has both a local and remote panel. The suction pressure control that starts, stops, loads and unloads the compressors was designed to be time-proportional.

Other systems built by Cryoquip range from the conventional to −90°F quick freezers, from shipboard freezing to shore plants.

Circle number 22 on the Reader Inquiry Card.



2

3. Four hours to freezer

"Arctic Fresh" natural skinless, boneless cod and pollock fillets from Alaska are the products of the Arctic Trawler, a modern factory trawler/processor operating in the Bering Sea.

This frozen-at-sea whitefish comes packed for the institutional trade in 15-pound layer packs — three to a master carton. Within four hours after being hauled from the frigid Bering Sea, these fish have been bled, filleted, boned, candied and trimmed before flash freezing at −40°F.

The 296-foot Arctic Trawler is a pioneer. Equipped with the most modern processing machinery and assisted by experienced Norwegian trawlermen, this ship has set a precedent in American fisheries.

Trans-Pacific International Industries, Inc., of Seattle, own and operate the Arctic Trawler, along with a fleet of fishing, fisher/processor and freight vessels.

The "Arctic Fresh" label is marketed by Wilbur-Ellis Company, with offices in Seattle, San Francisco and Los Angeles.

Circle number 79 on the Reader Inquiry Card.

4. Keeping fish in shape

FISKoFREEZE, a development of Frigoscandia Contracting of Bellevue, Wash., is a new in-line freezing concept aimed at meeting the need for fast, continuous freezing of whole fish.

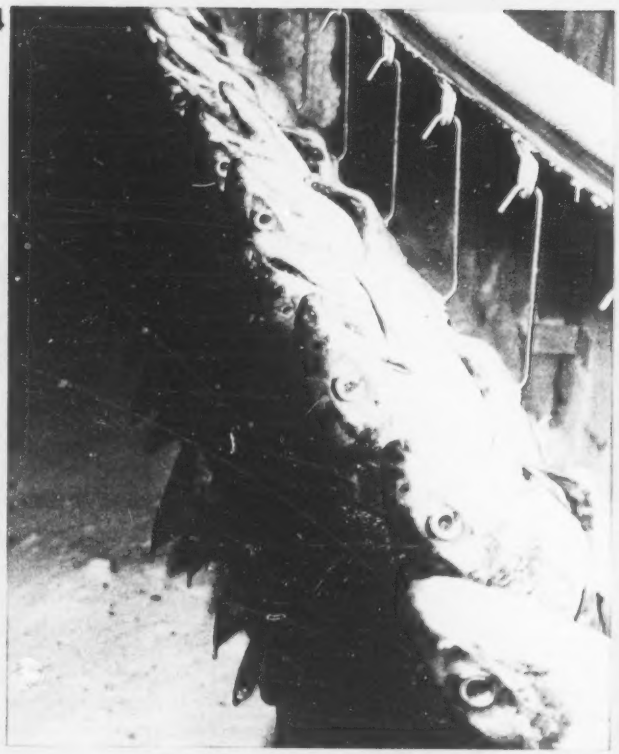
FISKoFREEZE uses a hanging clamp system supported by a moving overhead conveyor. Whole fish are hung by the head or nape with special clamps to result in distortion-free frozen shapes. Section pans packed with crab meat or herring can also be hung from the special conveyor and frozen in the system continuously.

A high-velocity air blast at low temperature, combined with the uniform product spacing, results in fast freezing times. Production tests show that whole five-pound salmon are frozen in only 2½ hours to 0°F core temperature.

The vertical hanging configuration results in a compact arrangement. Capacities range from 1500 up to 5000 pounds per hour. Space required for the largest capacity is only 60 x 135 x 8 feet.

A Mini FISKoFREEZE is also available with manual loading and unloading. The Mini model is self-contained with built-in refrigeration compressors, and is designed for freezing onboard smaller fishing vessels. See Fish Expo Booth 814.

Circle number 35 on the Reader Inquiry Card.



PAK-SHAPER
PAK-FORMER
TUNA FILLERS

ACCEPTED BY WORLD
TUNA CANNERS

Since 1949
E.H. CARRUTHERS CO.
P.O. Box 40
Warrenton, Oregon 97146
PHONE: (503) 861-2273
Telex: TWX 9104668421

Circle number 15 on the Reader Inquiry Card

INSURANCE BROKERS
and
CONSULTANTS
to the
FISHING INDUSTRY

FRANK B. HALL & CO.
OF WASHINGTON

300 Elliott Avenue West
Seattle, Washington 98119
Phone: (206) 284-4890
TLX: 32-8894 HALLCOY SEA

OFFICES IN ALASKA
AND
THROUGHOUT THE WORLD

Circle number 38 on the Reader Inquiry Card

5. Back-up strapper

Weld-Loc's new Model 361 Vibratory Sealing Tool is being promoted by the Ohio manufacturer as a back-up to automatic strapping machines in peak packing periods. The tool automatically tensions, seals, and cuts strapping ⅜" to ¾" wide and is equipped with a single-phase motor (220V or 110V) that can be used wherever there's an electrical outlet. The operator inserts the strap, pushes a lever, and the rest is done • automatically.

The low weight of the Strapex Vibratory Sealing Tool makes it suitable for palletizing, whether you

5

apply a vertical or horizontal strap or use the tool on top of the pallet. See Fish Expo Booth 6228.

Circle number 82 on the Reader Inquiry Card.

6. A line on fish sticks

Ross Industries, manufacturers of high-speed slicing and molding equipment for the meat and seafood industries, has engineered a fish stick processing line that can be used in pieces or in combination.

A typical Ross fish portion control line, designed for a medium production load of 4,000 pounds per hour, consists of one 660 pre-sizing press, one 950M seafood slicer and one 712 pre-portioner.

The line is set up with the pre-sizing press feeding the pre-portioner, which in turn feeds the seafood slicer from which the fish sticks are packed off and boxed.

Three people are required to operate the processing line. One person unwraps the frozen blocks and feeds them through the 660 pre-sizing press, which modifies the blocks to a product of uniform density and dimension. Once through the pre-sizing press, the blocks are loaded into the 712 pre-portioner for reduction into fish logs.

The 712 Pre-Portioner's

6

For Over 60 Years Suppliers of

QUALITY CANNED SALMON

FROZEN SALMON, HALIBUT and SHELLFISH

To World Markets

CALKINS & BURKE LIMITED

ASTRA BRAND PRODUCTS

1477 West Pender St.
Vancouver, B.C. V6G 2S6
Canada

CABLE ADDRESS:
"KINCAL"

TELEPHONE:
(604) 669-3741

Processing Plant & Cold Storage
329 Railway Street
Vancouver, B.C.

TELEX:
04-508829

ANSWER BACK:
KINCAL VCR

Circle number 14 on the Reader Inquiry Card

main function is to split the fish blocks into logs of uniform dimension so that they can be fed into the hoppers of the high-speed slicer by the second production worker. The pre-portioner hopper will hold ten blocks at a time, with fully automatic cycling and production rates of 10,000 to 14,000 pounds per hour.

When the fish blocks have been re-sized and split into pre-portioned logs, they are sliced into retail portions on a 950M seafood slicer. Logs are fed into the slicer through several vertical chute systems. The seafood slicer produces up to 24,000 fish sticks, up to 7/8" thick, per hour. The seafood slicer may be continuously loaded while operating.

The third production worker packs fish sticks off the slicer conveyor and culls out the ends and broken pieces, which are returned to the pre-sizing press for recycling. The maximum product loss is 1%-2% using this sytem.

Circle number 64 on the Reader Inquiry Card.

7

7. Hang it all

The Sea-Weigh electronic digital hanging scale by Measurement Systems International of Seattle features microcomputer circuitry, push-button zero, and digital motion dampening for greater display stability. The load cell to meter cable is custom designed to withstand the abuse of at-sea use and maintains a test strength of 900 pounds.

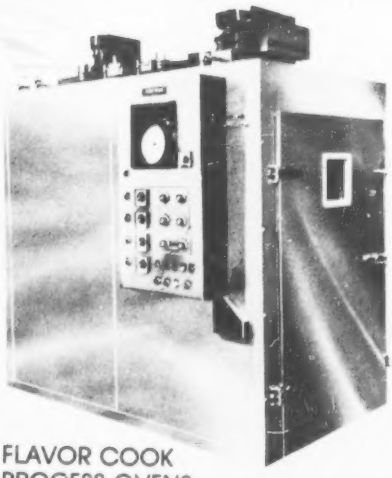
Now a new microcomputer-based (MSI-150XP) printer has been added to the line. The printer records an array of data such as time, date, individual and total weights, job numbers and elapsed time.

Other standard features of this scale are durability under the rigors of at-sea use and electronic circuit boards designed for easy troubleshooting and replacement by non-technical personnel. All electronic printer circuit boards are coated with a moisture-resistant material to protect against humidity and ocean spray. The display is placed within a NEMA all-weather enclosure capable of being locked against tampering. See Fish Expo Booth 832.

Circle number 52 on the Reader Inquiry Card.

ONE STOP

Everything you need! for SMOKED FISH



FLAVOR COOK
PROCESS OVENS
One truck
Two truck
One truck economy

Improve shelf life
Increase yield
Enhance appearance

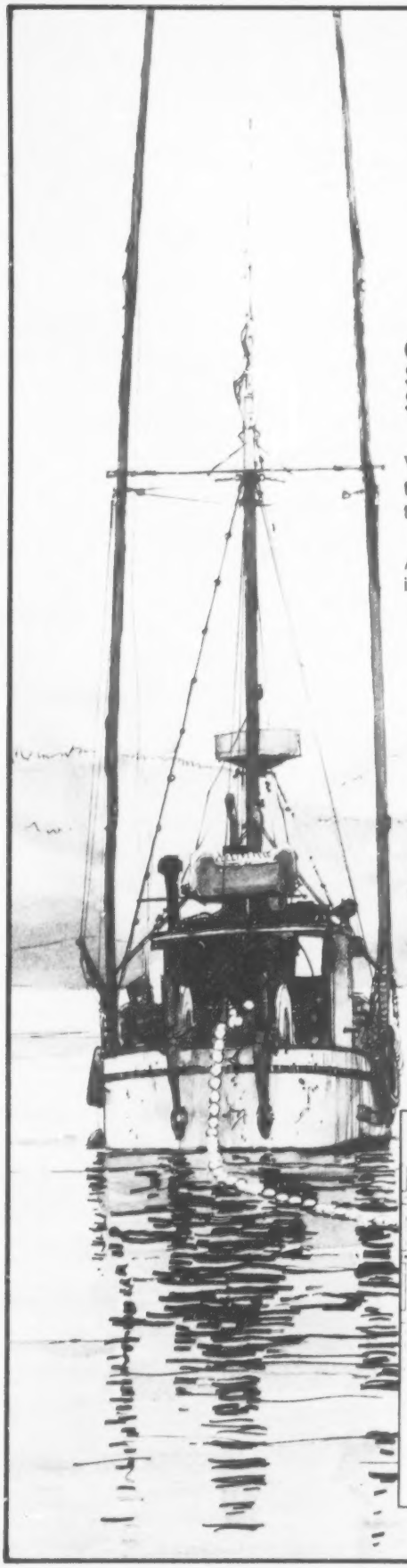
**"See Us At
FISH EXPO
Booths #6221, 6223."**

VACU-FRESH
VACUUM PACKAGING MACHINES
Single chamber
Double chamber
8 models to choose from

TOLL FREE: 800-421-6265
CALIFORNIA COLLECT: 213-268-8514

MEAT PACKERS & BUTCHERS SUPPLY COMPANY

Circle number 53 on the Reader Inquiry Card



FISH EXPO '81

The Number One Show for Packers and Processors

Sponsored by National Fisherman

October 28-31, 1981
Seattle Center
Seattle, Washington

Over 400 Exhibits—
The World's Largest
Fishing Exposition

Visit the **COLISEUM, EXHIBITION HALL,** and **FLAG PAVILION** to see the full range of exhibits displaying the latest in equipment and services for the commercial fishing industry.

A variety of topics will be discussed in the seminars program which begins at 9 a.m. in the EXHIBITION HALL. Don't miss these informative meetings!

Joint Ventures — Bering Sea
Processing Energy
Surimi
Food Management
& Galley Design
Longline Systems

Development & Foundations
Aquaculture
Fisheries Politics
Trawl Gear & Electronics
Seafood Cookery
Vessel Conversions

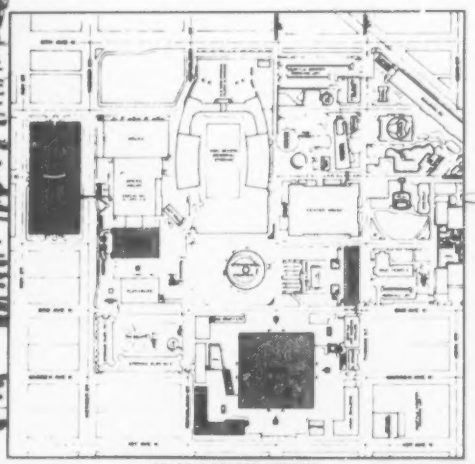
Alternatives for smaller vessels
Plant layout & modification
Cooperatives
Marketing Know-How
Fishing Energy

For further information on Fish Expo '81 exhibit space, activities, or convention rate hotel forms, contact:

National Fisherman Expositions, Inc.
21 Elm Street
Camden, Maine 04843
(207) 236-4342
Cable NATFISH
TWX 710-222-1645

West Coast Office
National Fisherman
Expositions, Inc.
4215 21st Avenue West
Seattle, Washington
98199
(206) 283-1150

In Europe:
Roger Sherman
ECL (Exhibition
Agencies) Ltd.
11 Manchester Square
London W1M 5AB
England
Telephone 01-486-1951
Cable MONTBUILD



SEATTLE CENTER SITE MAP

Attend the Fish Expo Seafood Banquet Friday, October 30, 1981, held in the North Court rooms of the Seattle Center. A chance to taste a lavish variety of seafood, elegantly prepared, you won't want to miss!

Full size map available in official show program.

Circle number 31 on the Reader Inquiry Card

8

8. Weighing in

A self-contained, battery-operated Digital Crane Scale has been introduced by W.C. Dillon & Company, Inc., of Van Nuys, Calif.

Parallax-free readings are offered by an illuminated display with numerals large enough to be seen at a distance. Accuracy of 0.1% of full range is guaranteed for the 2,000-, 5,000- and 10,000-pound models. Higher ranges are guaranteed to within 0.25% of full scale.

Twelve different capacities range from 2,000 to 50,000 pounds and 1,000 to 20,000 kilograms. All feature a high degree of resolution and a 5:1 design safety factor. A 20% tare compensation cancels unwanted weight of slings and other lifting attachments, so only the payload is tallied. A 360° swivel hook is supplied on capacities above 20,000 pounds. Large lifting eye is standard.

A built-in, six-volt battery provides up to ten hours of continuous use and can be recharged overnight. A spare battery kept on charge assures the scale will always be operational when needed.

Circle number 27 on the Reader Inquiry Card.

9. Cove construction

Alaska Food Company, Inc. (AFC) is currently expanding the Gibson Cove processing plant formerly operated by New England Fish Company. The expansion of the AFC facility is to accommodate year-round production of Alaskan whitefish products, including Pacific cod, Alaska pollock, Pacific ocean perch and other rockfishes, and various species of flatfish. When completed, the AFC plant will be a highly mechanized production facility featuring automated unloading, grading, weighing and storage of incoming product by size and species. Three mechanical filleting lines will be fed by conveyor, and the trimmed and candled fillets will be frozen either IQF or in shatterpack. Phase II of the expansion will include a finished products processing area, where minced, formed and extruded products will be battered and breaded into ready-to-eat products for both the retail and food service industries.

Circle number 3 on the Reader Inquiry Card.

10. Better brining

An automatic fish brining machine from Britain is claimed by its manufacturer to increase productivity and give a better and more consistent quality of brining than conventional methods.

Filleted fish are tipped down a chute into the Afos Auto Briner and floated at a set speed through a tank of brine, emerging on a conveyor at the other end. Adjustment of paddle speed and brine strength according to the size and type of fish gives full control over the amount of salt — and color — absorbed, ensuring a standard quality product.

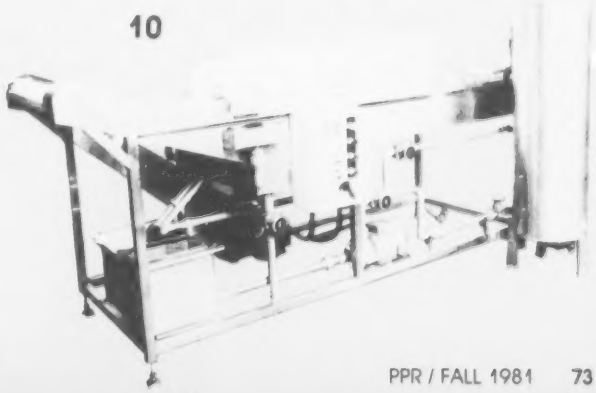
Dry salt is added as necessary to the water in the cylindrical make-up tank to maintain the strength of the brine, which is pumped around the system and filtered for recirculation. A brinometer monitors the brine's specific gravity. The tanks incorporate release valves or openings for quick discharge and easy cleaning.

All materials, including the stainless steel body and tanks and the plastics and nylon of the conveyor systems, are resistant to corrosion by the high-strength brine.

The machine is available in three sizes with hourly fish processing capacities of 230 kg, 450 kg and 680 kg. All are approximately 1500 mm high, 1500 wide and from 2600 to 4500 mm long. They require connection to a main water supply and 3-phase 415V electricity supply. Power rating is 1 kW. See Fish Expo Booth 6504.

Circle number 1 on the Reader Inquiry Card.

10



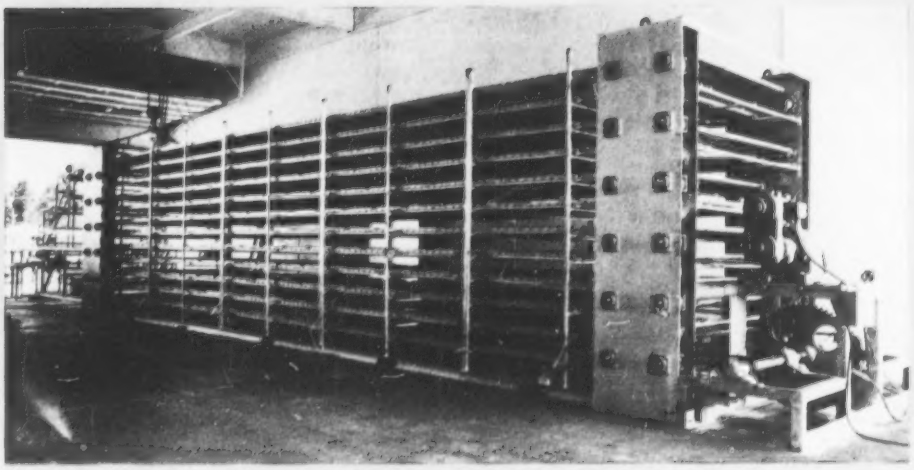
11. Speedier freezing

Cloudy & Britton, refrigeration contractors in Mountlake Terrace, Wash., have developed a Continuous Linear Conveyor system aimed at circumventing the problems of batch freezing and allowing cuts in the labor necessary for the process.

The conveyor system is composed of trays entering a refrigerated area (where freezing immediately begins) to follow a 40-foot path through 12 tiers in a 3½- to 4-hour cycle. The ejected product is measured at −5° to −6°F at the backbone.

The process eliminates the carts, racks, baskets, etc., necessary for batch freezing and the sanitation, transportation and storage of these items. Total freezing time is reduced as the product begins freezing at entry, and load and strip time is eliminated. A controlled air flow prevents dead spots in the freezing area. And as the conveyor method is expanded throughout the packaging process, manpower can be reduced. Speed set for the conveyor also controls production rate.

Circle number 18 on the Reader Inquiry Card.



11

12. Small packages

Sabroe Marine in Seattle is now offering a variety of Standard Marine Condensing Units Type MSS for Refrigerated Sea Water Systems (RSW).

The packaged units type MSS have been designed in six standard sizes, to give a complete line of marine-packaged refrigerating systems for RSW holding tanks, fitting the installation into a package of minimum size and weight without compromising on serviceability.

Horizon Fish Co.

Specializing In
Fresh Fish From
The Pacific Coast

HORIZON FISH CO.
P.O. Box 618
Corte Madera, CA 94925
(415) 924-8350
Telex: 340319

Circle number 40 on the Reader Inquiry Card

Seapro TransFresh

Custom Seafood Processors

- Salmon and Halibut Processing Services for the Fresh and Frozen Markets
- Space Reservation with Affiliated Seattle Warehouses for Cold Storage Services
- Herring Freezing Services

April 1 to September 30
1304 Laona Circle, P.O. Box 10-1727, Anchorage, AK 99511
(907) 279-9595, Telex No. 090 26 684

October 1 to March 31
202 S.W. Michigan St., P.O. Box 24978, Seattle, WA 98124
(206) 767-7350, Telex Number 32-0255

Circle number 70 on the Reader Inquiry Card

Dimensions for a unit with 80-ton capacity are 55" x 104".

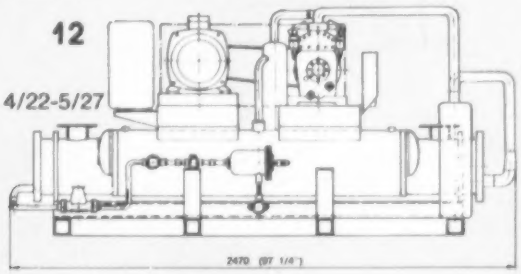
The chillers are shell and tube type, manufactured in molybdenum-alloy stainless steel that ensures there will be no corrosion problems, as it meets future requirements of E.P.A., Canadian and Norwegian environmental food and health regulations.

The units are factory-engineered and assembled to provide a balanced refrigerating system requiring a minimum of installation work. Only water and power connections need to be completed to make the units operational. See Danish exhibit at Fish Expo.

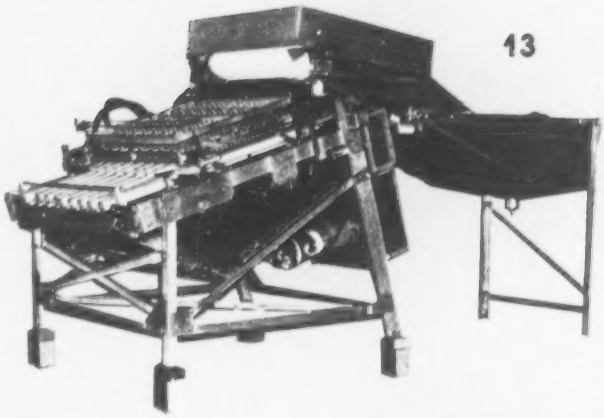
Circle number 66 on the Reader Inquiry Card.

12

MSS 4/22-5/27



13



13. Upping the yield

The FOS-KIT Model "S" is a phosphate-treatment modification designed to improve the yield of existing cooked shrimp peelers.

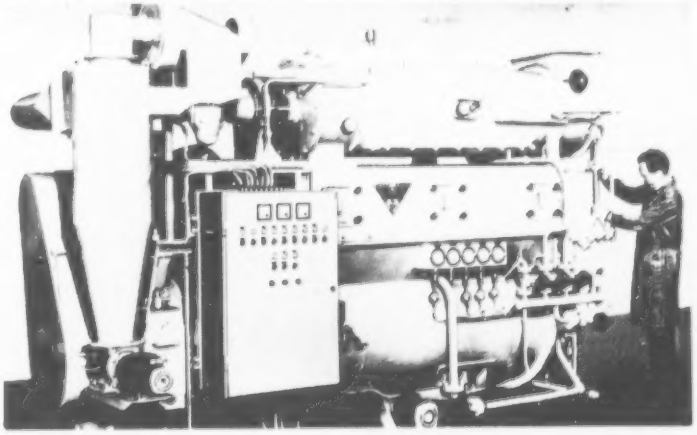
According to promotional material from Freezing Systems, Inc., in Redmond, Wash., field tests verify the 5%-7% peeled shrimp yield increase predicted by lab tests in Oregon in 1979.

Equipment can be installed one peeler at a time during the processing season, with payout after only 45 hours of total operation. The special design removes steam condensate directly from the peeler, reducing the chilling load on the phosphate solution and reducing phosphate usage.

Total phosphate systems can be provided; phosphate storage tanks and mixing tanks are available if chilling is not required. Entire units come as a kit with all parts supplied. One unit can be installed by two men in one day, and installation instructions are provided so in-plant labor can be used.

Circle number 34 on the Reader Inquiry Card.

FISH WASTE OR CRAB WASTE PROBLEMS?



You find ATLAS-STORD reduction plants all over the world. In USA, Canada and New Foundland there are more than 30 reduction plants with ATLAS-STORD equipment.

ATLAS-STORD offers you simple, economical and reliable equipment for reduction of waste and industrial fish. We undertake complete planning, delivery, supervision or complete installation. Our after service is well known world wide. In North America we have representatives and spare part stocks in New Foundland, the Maritimes, New York and at the West Coast.

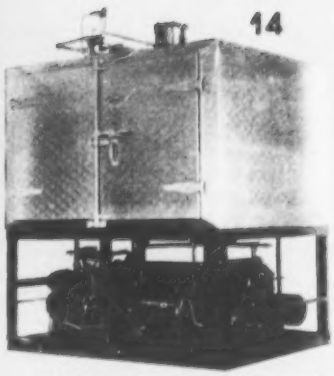
Stord Bartz a·s

Bergen — Norway. Tel.: (05) 21 10 30. telex: 42051

New York: Stord Bartz Americas, Inc.
1 North Broadway
White Plains, N.Y. 10601
Tel.: (914) 949-8588

See Us At FISH EXPO, Booth #525

Circle number 76 on the Reader Inquiry Card



14

15. Freshness by the numbers

The Torrymeter is a new electronic instrument by GR International Electronics for the quick testing of the freshness degree of fish. The Torrymeter resembles an electric razor and measures the ability of fish cells to conduct electricity.

The instrument is simply placed on the fish body and a measure of electrical resistance appears within seconds on a numerical, luminous indicator. For example, the number 14 on the indicator would mean that the fish had been lying on ice for 2 days. The number 4 would indicate 18 days. Through random samples, the freshness degree of an entire catch can be obtained. See Fish Expo Booth 6506.

Circle number 37 on the Reader Inquiry Card.

16. Fifty-hands fast

The Model 638 Salmon Gutter by Ryan Seafood Processing Equipment in Seattle is a machine designed to handle the complex job of gutting fresh/frozen salmon. Tests have shown that, at 20-25 fish per minute, the #638 does in an hour what it takes 25 people to do by hand.

The guillotined salmon is fed, body first, into the gutter, which slices open the stomach cavity. The roe is removed and sent onto a conveyor belt below. The fish, meanwhile, moves down the line, where wheels and brushes finish the gutting process. Next it proceeds to the slimer section, which removes the kidney mass. Finally, the belly cavity is thoroughly washed, and the fish is ejected from the machine.

The #638 can handle three- to nine-pound sockeye, chum, pink, or similar fish. Special provisions may be made to process smaller or larger fish. According to the manufacturer, the machine's simple design allows easy access for inspection, clean-up and maintenance. Controls are mounted for easy use by untrained workers. See Fish Expo Booth 6518.

Circle number 84 on the Reader Inquiry Card.

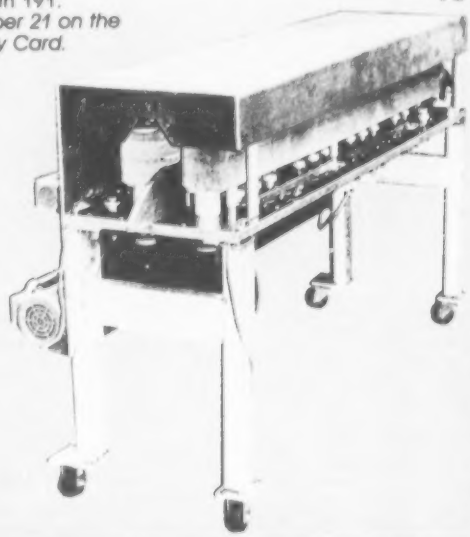
14. You can take it with you

The new Amerio Model 15 by Crepaco, Chicago, Ill., is a contact plate freezer with appeal for onshore processors in remote areas. Since the unit is self-contained, it can be moved from one place to another, and, where required, it can be fitted with a marine condenser for seawater service.

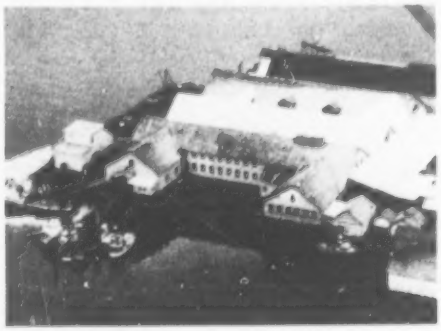
The Model 15 uses the standard 48" x 55" energy-efficient aluminum extruded plate and includes seven freezing stations. This will provide a through-put rate of up to 600 lbs. per hour of freezing fish fillets. The lower part of the unit consists of a self-contained R-22 refrigeration system, with a motor-compressor that is field serviceable, a shell and tube condenser/receiver, all electrical controls, and interconnecting piping. All that is required for installation is a water pipe to and from the unit and electrical wiring to the main disconnect. See Fish Expo Booth 191.

Circle number 21 on the Reader Inquiry Card.

16



ANNETTE ISLAND PACKING COMPANY



Fresh, Frozen, Smoked
SEAFOODS

Halibut · Salmon · Herring
Black Cod
CANNED SALMON

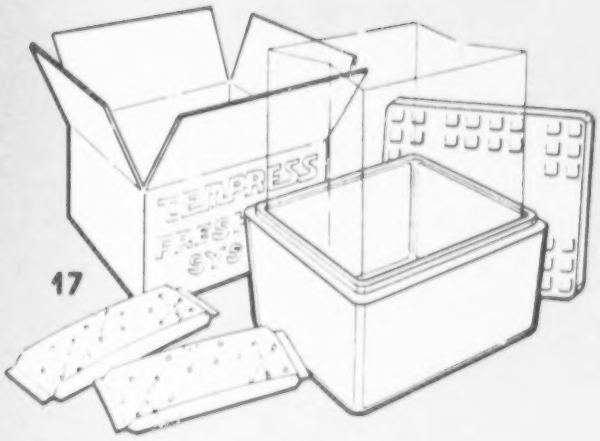
There's a good reason for the popularity of Annette Island Packing Company products. Our plant is ideally located adjacent to the fishing grounds. Particular pride is taken in handling and processing. Quality is our reputation. We take this opportunity to thank our business associates, our fishermen, and our customers who contribute to the successes of our operation.

PLANT:
P.O. Box 6
Metlakatla, Alaska 99926
Cannery Phone: 907-886-4661
Cold Storage Phone: 907-886-6944

BAIT
&
ICE

CORRESPONDENCE OFFICE:
4802 20th Avenue N.W.
Seattle, WA 98107
Phone: 206-782-8882

Circle number 7 on the Reader Inquiry Card

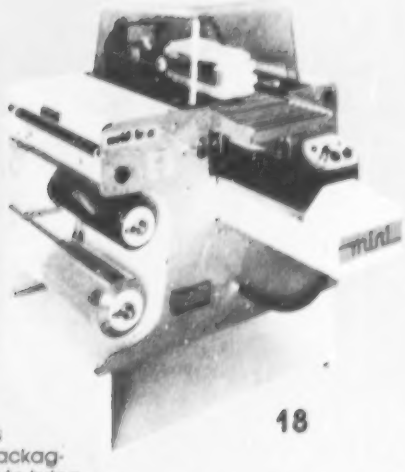


17. Packing up

The Fresh-Pak System by Tempress in Seattle, Wash., offers four answers to packing needs. Pak Ice refrigerant gel in 1½-lb. bags provides efficiency with minimum product displacement. The 25-lb. Poly Pak is a gusseted 2 mil bag with fitted liner.

The system's 25-lb. fillet box with 0.59-cu.-ft. capacity and ¾" wall thickness offers thermal protection during transit. It has a tongue and groove lid, and stacking lugs are molded in to improve palleting stability. The 25-lb. fillet box with Over Pak complies with airline regulations and is 125-lb. test corrugated.

Circle number 78 on the Reader Inquiry Card.



18

18. Wrapping it up

Weldotron Corp., Piscataway, N.J., has developed a new packaging system designed to bring the benefits of automation to the backroom operations of large and small supermarkets, even where space is very limited.

The A4 MINI is controlled by a solid-state microprocessor; all mechanical movements are controlled by a single cam. The A4 handles all stretch films and a variety of tray types common to supermarkets at speeds up to 20 packages per minute. Film size is electronically controlled by a simple hand dial, and film-roll changeover can be accomplished in 15 seconds. Package height and width adjustments are automatic. See Fish Expo Booth 6500.

Circle number 83 on the Reader Inquiry Card.

INTEROCEAN SEAFOODS COMPANY

salmon
king crab
snow crab
dungeness crab
scallops
sardines
salmon roe
mackerel

inseaco

herring
tuna
halibut
squid
bottom fish
pet food
shrimp

FRESH — FROZEN — CANNED — SMOKED — CURED

SEATTLE OFFICE
200 S.W. MICHIGAN STREET
SUITE 100 A
SEATTLE, WA 98106
PHONE: 206-767-6390
ITT TELEX: 474-0040

MAIN OFFICE
465 CALIFORNIA STREET
SAN FRANCISCO, CA 94104
PHONE: 415-421-5722
RCA TELEX: 27-8429
W/U TELEX: 34-0874
CABLE: INSEACO

FRENCH OFFICE
18 RUE DU DOCTEUR DUCHENNE
62200 BOULOGNE SUR MER,
FRANCE
PH: 21-303-299
TELEX: 842-820033

THE ONLY WEST COAST SEAFOOD COMPANY WITH OFFICES IN EUROPE.

Circle number 43 on the Reader Inquiry Card

Directory of Processors and Brokers

Information for the following processors and brokers was received too late for publication in the directories in the spring issue of *Pacific Packers Report.*

Processors

ALASKA FISH & CRAB, INC.
P.O. Box 70231
Seattle, WA 98107
(206) 789-6842
TWX: 910-444-4118
Personnel:
Will H. Brown, President, Sales & Plant Manager; Jean M. Brown, Purchasing Agent
Plant Locations and Capabilities
Naknek, AK — Floating Processor — Frozen salmon
Naknek, AK — Fresh & frozen salmon, salmon roe
Brand Packed Under:
Alaska Fish & Crab, Inc.

BANDON FISHERIES
250 1st Street S.W.
P.O. Box 1009
Bandon, OR 97411
(503) 347-2409 or
(800) 328-8304
Telex: 29-0602 IM MPS
Parent Company:
International Multifoods Corporation
Personnel:
Peter Warren, Sales Manager; Ronald W. Schmidt, Purchasing Agent, Plant Manager
Plant Location and Capabilities
Bandon, OR — Frozen & fresh crab, bottomfish, blackcod, salmon. Frozen shrimp
Brand Packed Under:
Oregon Choice, Bandon by the Sea

CENTRAL NATIVE FISHERMENS CO-OPERATIVE
303 Vernon Drive
Vancouver, B.C.
Canada, V6A 3N3
(604)255-6276
Telex: CNFC-04-53488
Personnel:
D. Larden, President; J. Elsey, Sales manager; W.R. Murdock, General Manager; M. Buston, Plant Mgr. (Ucluelet); W. Sedgewick, Plant Mgr. (Bella Bella)
Plant Locations and Capabilities:
Ucluelet, B.C. — Fresh/frozen salmon, herring, roe, tuna, blackcod, halibut
Bella Bella, B.C. — Fresh/frozen/canned salmon, herring, roe
Brand Packed Under:
CNFC

CHUGACH ALASKA FISHERIES, INC.
2111 West Commodore Way
Seattle, WA 98199
(206) 284-0804 or
(907) 424-3504 (summer)
Parent Company:
Chugach Natives, Inc.
Personnel:
James E. Forsell, President; Peter Maloney, Vice President
Plant Location and Capabilities
Cordova, AK — Frozen/canned salmon

LYON FOOD PRODUCTS INC.
2301 Nevada Ave. North
Golden Valley, MN 55427
(612) 544-4484
TWX: 910-576-1304
Personnel:
Dean E. Terry, President; Richard N. Juhl, Vice President & General Manager; Melvin Make, Operations Manager; Tom Wieken, National Sales Manager
Plant Locations and Capabilities:
Golden Valley, MN — Pickled herring, lutefisk (fresh & frozen)
Brand Packed Under:
Elf, Lyon, Viking

OAKLAND FISHERIES LTD.
630 Montreal Street
P.O. Box 756
Victoria, B.C.
Canada, V8W 2P9
(604) 388-5434
Telex: (21) 049-7296 JETSALMON
Parent Company:
Oakland Industries Ltd.
Personnel:
E.T. Easton, President; S.K. Dufour, Sales Manager; G. Maxwell, Purchasing Agent; R.S. Sonley, Plant Manager
Plant Locations and Capabilities
Victoria, B.C. — Fresh/frozen/smoked/canned salmon, herring whole, filleted, smoked, groundfish fillets & smoked, prawns
Brand Packed Under:
Sea Pride, Treasure Island

PACIFIC PEARL SEAFOODS
1203 114th S.E.
Bellevue, WA 98004
(206) 453-4600
Telex: 32-0068
Parent Company:
Amfac, Inc.
Personnel:
Fred Bolthouse, President; Michael Ahlstrom, Vice President Sales & Marketing; Reg. Muller, Vice President Operations; Douglas Irvine, Director of Food Service Sales
Plant Locations and Capabilities
Kodiak AK — Canning & freezing
Soldovia & Dutch Harbor, AK — Freezing
Bellingham, WA — Reprocessing
Canned shrimp, snow crab, smoked oysters, boiled oysters, smoked baby clams, smoked mussels, kippered snacks.
Frozen king, snow & Dungeness crab, shrimp, crab/shrimp, deviled crab, halibut, salmon
Brand Packed Under;
Frozen: Wakefield
Canned: Pacific Pearl

PAN-ALASKA FISHERIES, INC.
P.O. Box 17705 Fishermen's Terminal
Seattle, WA 98107
(206) 284-0900
Telex: 32-9439
Parent Company:
Castle & Cooke, Inc.
Personnel:
Ronald Jensen, President; Blake Kinnear, Vice President; Les Hodges, Sales Manager; Phil Berger, Purchasing Agent
Plant Locations and Capabilities:
Kodiak, Unalaska, AK — Processing Plants; Monroe, WA — Cold Storage; M/V Royal Sea, M/V Royal Venture, M/V Aleutian Monarch — King crab, snow crab, salmon, shrimp, bottomfish
Brand Packed Under:
Royal Alaskan, Bumble Bee

PRINCE RUPERT FISHERMEN'S CO-OPERATIVE ASSOCIATION
Fairview Bay, P.O. Box 520
Prince Rupert, B.C.
Canada, V8J 3R7
(604) 624-2146
Personnel:
Michael Florian, President; Robert A. Shumka, Chief Executive Officer; Michael Thompson, Sales Manager; Al Brown, Purchasing Agent; Robert Strand, Fleet & Distribution Manager; George Hills, Production Manager
Plant Locations and Capabilities:
Ucluelet — Fresh salmon
Winter Harbor — Fresh salmon; Vancouver — Fresh & frozen salmon, halibut, herring, tuna; Prince Rupert — Fresh & frozen salmon, halibut, herring, groundfish, shellfish, tuna, blackcod, fish meal & oil
Brand Packed Under:
Hy-Wave, Challenger, White Crest

TRIDENT SEAFOODS CORPORATION
653 N.W. 41st Street
Seattle, WA 98107
(206) 783-3818
Telex: 32-1266
Personnel:
Charles H. Bundrant, President; Roger M. Dahlke, Sales Manager; Dave Rocke, Purchasing Agent; Bill Howell, Plant Manager
Plant Location and Capabilities:
Akutan, AK — Frozen king and snow crab
Brand Packed Under:
Trident

WESTERN YUKON FISHERIES INC.
3400 West International Airport Road
Anchorage, AK 99502
(907) 248-2950
Telex: 26-323
Personnel:
John Sweeney Jr., President & General Manager; Larry Ledlow, Purchasing Agent
Plant Location and Capabilities:
Pitkas Point, AK — Fresh/frozen salmon

Directory of Processors and Brokers

Information for the following processors and brokers was received too late for publication in the directories in the spring issue of *Pacific Packers Report*.

Processors

ALASKA FISH & CRAB, INC.
P.O. Box 70231
Seattle, WA 98107
(206) 789-6842
TWX: 910-444-4118
Personnel:
Will H. Brown, President, Sales & Plant Manager; Jean M. Brown, Purchasing Agent
Plant Locations and Capabilities
Naknek, AK — Floating Processor — Frozen salmon
Naknek, AK — Fresh & frozen salmon, salmon roe
Brand Packed Under:
Alaska Fish & Crab, Inc.

BANDON FISHERIES
250 1st Street S.W.
P.O. Box 1009
Bandon, OR 97411
(503) 347-2409 or
(800) 328-8304
Telex: 29-0602 IM MPS
Parent Company:
International Multifoods Corporation
Personnel:
Peter Warren, Sales Manager; Ronald W. Schmidt, Purchasing Agent, Plant Manager
Plant Location and Capabilities
Bandon, OR — Frozen & fresh crab, bottomfish, blackcod, salmon. Frozen shrimp
Brand Packed Under:
Oregon Choice, Bandon by the Sea

CENTRAL NATIVE FISHERMENS CO-OPERATIVE
303 Vernon Drive
Vancouver, B.C.
Canada, V6A 3N3
(604)255-6276
Telex: CNFC-04-53488
Personnel:
D. Larden, President; J. Elsey, Sales manager; W.R. Murdock, General Manager; M. Buston, Plant Mgr. (Ucluelet); W. Sedgewick, Plant Mgr. (Bella Bella)
Plant Locations and Capabilities:
Ucluelet, B.C. — Fresh/frozen salmon, herring, roe, tuna, blackcod, halibut
Bella Bella, B.C. — Fresh/frozen/canned salmon, herring, roe
Brand Packed Under:
CNFC

CHUGACH ALASKA FISHERIES, INC.
2111 West Commodore Way
Seattle, WA 98199
(206) 284-0804 or
(907) 424-3504 (summer)
Parent Company:
Chugach Natives, Inc.
Personnel:
James E. Forsell, President; Peter Maloney, Vice President
Plant Location and Capabilities
Cordova, AK — Frozen/canned salmon

LYON FOOD PRODUCTS INC.
2301 Nevada Ave. North
Golden Valley, MN 55427
(612) 544-4484
TWX: 910-576-1304
Personnel:
Dean E. Terry, President; Richard N. Juhl, Vice President & General Manager; Melvin Make, Operations Manager; Tom Wieken, National Sales Manager
Plant Locations and Capabilities:
Golden Valley, MN — Pickled herring, lutefisk (fresh & frozen)
Brand Packed Under:
Elf, Lyon, Viking

OAKLAND FISHERIES LTD.
630 Montreal Street
P.O. Box 756
Victoria, B.C.
Canada, V8W 2P9
(604) 388-5434
Telex: (21) 049-7296 JETSALMON
Parent Company:
Oakland Industries Ltd.
Personnel:
E.T. Easton, President; S.K. Dufour, Sales Manager; G. Maxwell, Purchasing Agent; R.S. Sonley, Plant Manager
Plant Locations and Capabilities
Victoria, B.C. — Fresh/frozen/smoked/canned salmon, herring whole, filleted, smoked, groundfish fillets & smoked, prawns
Brand Packed Under:
Sea Pride, Treasure Island

PACIFIC PEARL SEAFOODS
1203 114th S.E.
Bellevue, WA 98004
(206) 453-4600
Telex: 32-0068
Parent Company:
Amfac, Inc.
Personnel:
Fred Bolthouse, President; Michael Ahlstrom, Vice President Sales & Marketing; Reg. Muller, Vice President Operations; Douglas Irvine, Director of Food Service Sales
Plant Locations and Capabilities
Kodiak AK — Canning & freezing
Soldovia & Dutch Harbor, AK — Freezing
Bellingham, WA — Reprocessing.
Canned shrimp, snow crab, smoked oysters, boiled oysters, smoked baby clams, smoked mussels, kippered snacks.
Frozen king, snow & Dungeness crab, shrimp, crab/shrimp, deviled crab, halibut, salmon
Brand Packed Under;
Frozen: Wakefield
Canned: Pacific Pearl

PAN-ALASKA FISHERIES, INC.
P.O. Box 17705 Fishermen's Terminal
Seattle, WA 98107
(206) 284-0900
Telex: 32-9439
Parent Company:
Castle & Cooke, Inc.
Personnel:
Ronald Jensen, President; Blake Kinnear, Vice President; Les Hodges, Sales Manager; Phil Berger, Purchasing Agent
Plant Locations and Capabilities:
Kodiak, Unalaska, AK — Processing Plants; Monroe, WA — Cold Storage; M/V Royal Sea, M/V Royal Venture, M/V Aleutian Monarch — King crab, snow crab, salmon, shrimp, bottomfish
Brand Packed Under:
Royal Alaskan, Bumble Bee

PRINCE RUPERT FISHERMEN'S CO-OPERATIVE ASSOCIATION
Fairview Bay, P.O. Box 520
Prince Rupert, B.C.
Canada, V8J 3R7
(604) 624-2146
Personnel:
Michael Florian, President; Robert A. Shumka, Chief Executive Officer; Michael Thompson, Sales Manager; Al Brown, Purchasing Agent; Robert Strand, Fleet & Distribution Manager; George Hills, Production Manager
Plant Locations and Capabilities:
Ucluelet — Fresh salmon
Winter Harbor — Fresh salmon; Vancouver — Fresh & frozen salmon, halibut, herring, tuna; Prince Rupert — Fresh & frozen salmon, halibut, herring, groundfish, shellfish, tuna, blackcod, fish meal & oil
Brand Packed Under:
Hy-Wave, Challenger, White Crest

TRIDENT SEAFOODS CORPORATION
653 N.W. 41st Street
Seattle, WA 98107
(206) 783-3818
Telex: 32-1266
Personnel:
Charles H. Bundrant, President; Roger M. Dahlke, Sales Manager; Dave Rocke, Purchasing Agent; Bill Howell, Plant Manager
Plant Location and Capabilities:
Akutan, AK — Frozen king and snow crab
Brand Packed Under:
Trident

WESTERN YUKON FISHERIES INC.
3400 West International Airport Road
Anchorage, AK 99502
(907) 248-2950
Telex: 26-323
Personnel:
John Sweeney Jr., President & General Manager; Larry Ledlow, Purchasing Agent
Plant Location and Capabilities:
Pitkas Point, AK — Fresh/frozen salmon

Brokers

ACLI SEAFOOD COMPANY
302 Magazine Street
New Orleans, LA 70130
(504) 581-4220 or
(504) 581-2700
TWX 810-951-5053
717 Westchester Ave.
White Plains, NY 10604
(914) 683-8055
Species Handled:
Frozen: shrimp, king crab, scallops, lobster, salmon, red snapper, frog legs

C.N.F.C. MARKETING LTD.
2415 Commissioner Street
Vancouver, B.C.
Canada V5K 1A1
(604) 254-9654
Telex: 04-55412 MILLBANKE
Specied Handled:
Canned: salmon; Frozen: salmon, halibut, blackcod, tuna

CREST INTERNATIONAL CORPORATION
1400 5th Ave., Suite 401
P.O. Box 1671 98112
San Diego, CA 98101
(714) 231-1391
Telex: 695-469
Species Handled:
Frozen: shrimp, lobster, crab, scallops, squid

SIGNIA SEAFOOD CORPORATION
120 Wall Street
New York, NY 10005
(212) 269-5842
Telex: 62598 WUI
Species Handled:
Frozen: shrimp, lobster tails, squid, crab meat, frog legs, langostinos

ROBERT A. SMITH SEAFOODS COMPANY
520 Charles Street
Billings, MT 59102
(406) 245-0922
Telex: 313-151
Species Handled:
Frozen: shrimp, crab legs, lobster, breaded/prepared items, oysters, scallops

Decatur Seafoods, Inc.

World Wide Trading Company
Fresh, Frozen, Canned Seafood

- **all Northwest seafood products**
- **canned salmon**
- **sales on commission**
- **direct purchases**

1515 Dexter Ave. N.
Seattle, WA 98109

Telex 32-8436
(206) 285-9110

Circle number 25 on the Reader Inquiry Card

POLAR STAR SALES, INC.

207 Fishermen's Terminal, Seattle, Wa. 98119
Telex: 32-8852 Ph. (206) 283-8000

Domestic & Export Sales

BRANDS
POLAR STAR
PACIFIC PRIDE

ALASKA SEAFOODS
Canned & Frozen

Circle number 62 on the Reader Inquiry Card

INTERNATIONAL PACIFIC SEAFOODS, INC.

"Seafood Is Our Only Business"

A Seafood Broker with a Firm Commitment to Marketing a Complete Line of High Quality Fresh and Frozen "Prime Source" Seafood.

Representing:

Universal Seafoods • Iceland Seafood Corp.
Sea-Snack Foods • Magic Springs Trout Farms
Farm Fresh Catfish Co. • Harbourside-Aquafoods
Empress International • Swiftsure Fisheries

INTERNATIONAL PACIFIC SEAFOODS, INC.

Los Angeles Office
11264 Rush St.
S. El Monte, CA 91733
Phone: 213-443-1135
Telex: 182-953

Arizona Office
6991 Camelback Rd., Suite C103
Scottsdale, AZ 85251
Phone: 602-990-1514
Telex: 165-847

Circle number 42 on the Reader Inquiry Card

Index to Tables

Alaska Salmon Landings	9	American Samoa, Puerto Rico and Hawaii Tuna Pack	14
British Columbia Canned Salmon Production	9	California Canned Tuna Prices	14
Troll Salmon Landings	9	Pacific Shellfish Landings	15
U.S. Cold Storage Holdings	10	Alaska Shellfish Wholesale Prices	15
Canned Salmon: Supply, Stocks and Shipments	11	1981 Halibut Landings	17
Bristol Bay Salmon Production	11	California Herring Landings	17
Canned Salmon Prices	11	1981 Alaska Herring Landings	17
Continental Tuna and Bonito Pack	14	Pacific Bottomfish Landings	17
		Alaska Bottomfish Catch	17

Index to Advertisers

ADVERTISER	PAGE	RIC NO.
Afos Limited	37	1
Alaska Airlines	2	2
Alaska Food Company, Inc.	59	3
Alaska Fresh Seafoods	31	4
Alaska-Shell, Inc.	16	5
American Fisheries Directory	62	6
Annette Island Packing Co	76	7
Autio Co.	48	8
L.S. Baier & Associates	10	9
Ballard Sheet Metal Works, Inc.	65	10
Beehive Machinery, Inc.	16	11
Bevis & Associates, Inc.	66	12
Birkenwald, Inc.	44	13
[illegible] & Burke Ltd.	70	14
Can-Am Containers Ltd.	80	85
J.H. Carruthers Co.	69	15
Castle & Cooke, Inc.	8	16
CB Equipment Co.	23	17
Coastline Equipment, Inc.	67	19
Commercial Fishing & Agriculture Bank	56	20
Crepaco, Inc.	15	21
Cryovac	42	23
Decatur Seafoods, Inc.	79	25
Digital Marine Electronics Corp.	27	26
Dixie Canner Equipment Co.	41	28
Epsco Marine	64	29
FDC Packaging Inc.	67	30
Fish Expo	72	31
Fishing Vessel Owners Marine Ways, Inc.	59	32
Foss Shipyard	25	33
Freezing Systems, Inc.	18	34
Frigoscandia Contracting, Inc.	33	35
Furuno, U.S.A., Inc.	Cover 3	36
Frank B. Hall & Co.	69	38
Harris Electric, Inc.	57	39
Horizon Fish Co.	74	40
Independent Fishermen's Packing Co.	21	41
International Pacific Seafoods, Inc.	79	42
Interocean Seafoods Co.	77	43
Intersea Fisheries, Ltd.	52	44
IPL Products Ltd.	24	45
KEM Equipment, Inc.	38	47
Kibun Products International	46	48
Kolstrand Supply Co.	39	49
Ludlow Packaging	12, 13	50
Marco Seattle	14	51
Meat Packers & Butchers Supply Co.	71	53
Merco Intertrade, Inc.	16	54
Morad Electronics Corp.	44	55
National Bank of Alaska	7	56
NC Machinery Co.	19	57
North West Handling Systems	22	58
Northern Products Corp.	57	59
Olympic Prefabricators, Inc.	54	60
Polar Star Sales, Inc.	79	62
Raytheon Marine Co.	Cover 2	63
Ryan Instruments	32	65
Scanmarin, Inc.	66	67
Sea-Alaska Products, Inc.	31	68
Sea-Land Service, Inc.	Cover 4	69
Seapro Transfresh Co.	74	70
Seattle First National Bank	60	71
Shafer-Haggart, Ltd.	40	72
Shearwater Seafood	21	41
Sorenson Transportation Co., Inc.	66	74
W.E. Stone & Co., Inc.	26	75
Stord Bartz Americas, Inc.	75	76
Swiftsure Fisheries, Inc.	1	77
Tempress Inc.	51	78
Turbo Marine Corp.	4	80
Ursin Seafoods, Inc.	3	81

YOUR CATCH COUNTS!

*Featuring the CAN-AM Stacking and Nesting Tote

- **Nests for storage and shipping**
- **No slip stacking when full**
- **Rugged design**
- **Easy to clean**

We at Can-Am Containers are convinced that your catch counts and that the quality of your catch must be delivered from the ship to the market to maximize profits. Our containers do just that. You don't have to pamper Can-Am containers; they're a working man's tool and they're built to work for you!

We offer a complete line of plastic container products for the fishing industry including stacking and nesting boxes, wharf boxes, shipping pails and barrels, trawl and net floats, process trays, and quick freeze pans. Our containers ensure the quality of your catch all the way to the market.

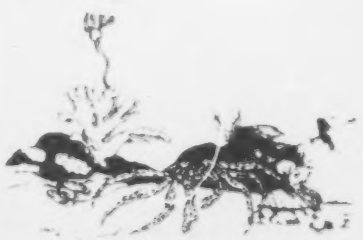
Manufactured in Atlantic Canada and trusted worldwide

CAN-AM CONTAINERS LTD.
P.O. Box 340, Springhill, N.S. B0M 1X0

*Write or phone for free literature today!

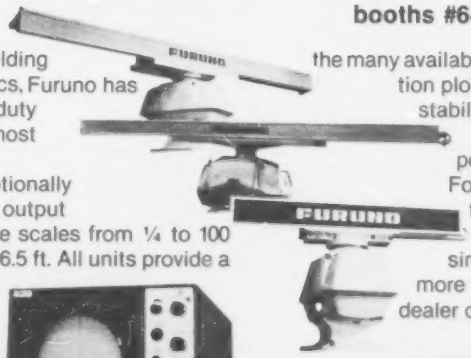
Ph: (902) 597-3787
Telex: 019-23552

Circle number 85 on the Reader Inquiry Card



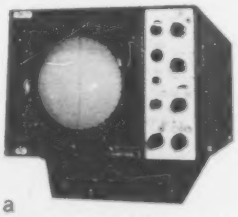
See a Furuno radar perform in the toughest conditions and you'll never switch radars again.

See us at FISH EXPO booths #643, 645, 744, 746



After 30 years experience building commercial marine electronics, Furuno has developed a family of heavy duty radars with features to fit almost any application.

SERIES 7 radars are exceptionally compact units with available output power from 5 to 25 kW, range scales from ¼ to 100 n.mi. and antennas from 3 to 6.5 ft. All units provide a 7" bright CRT, built-in VRM, 3 pulselengths for high discrimination, standard magnifiers and backlighted controls.



SERIES 10 radars offer the same basic performance features as above, but have a 10" CRT. Each unit has provision for a second built-in VRM and displays are available in bulkhead, table-top, or free-standing console versions. Also, the 25 kW models include optional gyro stabilization and provision for a reflection plotter.

SERIES 12 radars combine a 12" CRT with ¼ to 100 n.mi. range, 25 kW output and antenna length to 10' for operation anywhere. Standard features include digital VRM, circuit checkmeter, off-centering and three switchable pulse lengths for optimum performance in any situation. Among the many available options are reflection plotter, gyro or azimuth stabilization, radar alarm, second VRM and performance monitor. For complete information on any of these outstanding radars, simply visit one of our more than 200 authorized dealer outlets, or return the coupon below.

FURUNO U.S.A., INC.

Furuno. Choice of the professionals.

© 1981 Furuno U.S.A. Inc.

Member NMEA

Furuno U.S.A., Inc. • Dept. PP-10
P.O. Box 2343, 271 Harbor Way, South San Francisco, CA 94080

Please send literature on the unit(s) marked below, plus the name of my nearest authorized Furuno dealer.

☐ Series 7 Radars ☐ Series 10 Radars ☐ Series 12 Radars

Name _____

Address _____

City _____ State _____ Zip _____

Type of vessel owned _____

☐ *The illustration above is one in a series of 12 by artist Larry Winborg that are now being offered in three sets of 4 prints each, reproduced in brown sepia tone on 17"x22" heavy white art stock suitable for framing. Order any one or all sets directly from Furuno U.S.A. Just mark your choice below and enclose $5.00 per set for postage and handling.*

☐ *U.S. Fishing vessels* ☐ *Work boats of America* ☐ *American yachts*

Handled with care.

And handled fast. And handled efficiently. In fact, Sea-Land is one sure solution for your seafood-shipping problems. We don't stow your valuable cargo loose. Instead, our containerized packaging means less handling, less damage, less chance of pilferage. Our regularly-scheduled service means your shipments don't depend on when the catch comes in, or whether a ship happens to be available. Our itemized tracing system means that we always know just where your shipment is—and just when it will reach its destination. And all of these advantages mean smoother, faster, worry-free shipping for you.

When you ship with Sea-Land, you can be sure that your seafood will arrive on the customer's table just as it left the plant—in perfect condition.

Because it's been handled with care.

Brought to you by Sea-Land

Circle number 69 on the Reader Inquiry Card